

87-23

SOUTHWEST FISHERIES CENTER

NATIONAL MARINE FISHERIES SERVICE

SOUTHWEST FISHERIES CENTER

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LA JOLLA, CA 92038

OCTOBER 1987

**PINNIPED STUDIES CONDUCTED
BETWEEN AUGUST, 1981 AND
DECEMBER, 1982 AT SAN CLEMENTE
ISLAND, CALIFORNIA**

by

Charles W. Oliver and Mark S. Lowry

ADMINISTRATIVE REPORT LJ-87-23

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INTRODUCTION

The California sea lion (Zalophus californianus), northern elephant seal (Mirounga angustirostris), and harbor seal (Phoca vitulina richardsi) breed at San Clemente Island (SCI) and other islands off the southern California coast (Seagars, et al. 1985, Stewart and Yochem 1985). The National Marine Fisheries (NMFS) began monitoring of population trends for all three species at SCI in August 1981, and initiated a study of the feeding habits of the California sea lion. In this report we present information collected between August 1981 and December 1982 on: 1) seasonal distribution and numbers of these species, 2) California sea lion feeding habits from scat and spewing analysis, 3) dead marine mammals, and 4) tagged sea lions and northern elephant seals.

SCI is the third largest and southernmost United States-owned island in the southern California Bight (SCB). It is administered by the Department of the Navy, Naval Air Station at North Island, San Diego, California, and is used primarily for military operations. Our study area was located on the southwest coast extending from Seal Cove Point to "The Shack" (Figure 1), a linear distance of approximately 7.5 km. We divided this area into three unequal sub-areas: 1) North of Mail Point (NMP; 4.0 km), 2) Mail Point (MP; 0.5 km), and 3) South of Mail Point (SMP; 3.0 km) (Figure 2). Data were less frequently collected between "The Shack" and Lost Point (a linear distance of approximately 3.5 km) and at the Northwest Harbor Islet. The study area is characterized by a cactus and rock terrain above haulout and rookery areas. Haulout areas include rocky points and beaches as well as seven dirt covered flat areas above a cobblestone or rock shoreline. Haulouts had or were given specific names by the authors according to nautical charts, terrain characteristics or personal fancy (Figures 1-3).

METHODS

Counts and Distribution of Pinnipeds

We obtained complete counts of sea lions and elephant seals during two-day census periods. Counts were generally made from Seal Cove Point to Mail Point on one day, and continued from Mail Point to Arch Rock the next day (Figures 1-2). Complete counts required observations from atop Mail Point (Figure 3). If we did not ascend Mail Point, counts were considered incomplete although we made efforts to ascertain the presence or absence of animals at these areas from other locations. We censused pinnipeds using 7x50 or 10x50 binoculars, and were able to approach to within 30 meters or less of most of the animals while remaining concealed behind terrain features. However, some areas were censused at much greater distances, primarily the offshore rocks near Seal Cove Point, Tiki Head Beach, and at a harbor seal haulout at "The Shack" (Figure 2). We occasionally disturbed some animals during the peak of the pupping season in July while obtaining a complete count of sea lion pups, and during tagging efforts in March for elephant seals and in September for sea lions.

We categorized animals to age-classes whenever possible. California sea lions were minimally counted as either pups (young-of-the-year) or non-pups. Animals born during the summer of 1981 were counted as 1981-pups through May of 1982, after which they were counted as non-pups. Non-pups consisted of adults, subadults, and juveniles. We counted adult males holding territory during April through July of 1982. Northern elephant seals were classified as adults, subadults, juveniles, yearlings, or pups. The latter category was applicable during January through April of 1982. At other times, pups were possibly tallied as yearlings. We began surveying a harbor seal haulout at "The Shack" during the January 27-29, 1982 trip. Counts of harbor seals at "The Shack" were obtained using binoculars from a distance of approximately 100 meters. We classified harbor seals as either pups or non-pups.

California Sea Lion Feeding Habits Study

We collected California sea lion scats and spewings at MP and SMP, generally during midday after the animals had moved closer to the water's edge. Scats and spewings were individually bagged, labeled, and then frozen until analyzed. We cleared some haulouts of all uncollected scats and spewings during each trip thereby defining a time frame for samples found on the next trip. In the laboratory, scats and spewings were individually soaked in water and liquid detergent for three to five days and then sifted through a series of three screens to retrieve remains of prey items. The screens contained mesh sizes of 2.8mm, 1.4mm, and 1.0mm, respectively. These prey item remains (fish otoliths,

cephalopod beaks, fish teeth, and cartilaginous vertebrae) were then used to identify sea lion prey (Lowry 1986; Lowry and Oliver 1986). Cephalopod beaks were stored in ethanol while otoliths and other hard parts were air dried and stored in vials.

We primarily used otoliths and cephalopod beaks to identify prey items. The prey hard parts that exhibited characteristics similar to those of a particular prey but were either too digested or broken to be positively identified were categorized as a probable identification. Percent frequency of occurrence (PFO) was calculated for all positive and probable identifications from prey items found in California sea lion scats (Lowry and Oliver 1986). PFO was calculated only for scat and spewing samples which contained at least one prey item, and is defined as the percentage of scats and spewings yielding a particular prey. The PFO total of all prey will not generally equal 100% since more than one prey can occur in each scat. Scat and spewing data were entered into the SWFC computer database SCATDB.DAT (Lowry, 1986).

Salvage of Dead Marine Mammals

We salvaged dead marine mammals whenever possible within the study area, and during five beach surveys from Lost Point to the Shack. Salvage effort was secondary to census and scat collection and generally occurred in areas where animals were not immediately present. To reduce the amount of disturbance to the animals, we generally did not examine dead animals in most of the MP area, nor on the beaches below the "Uppers" in the area SMP (Figure 2). We noted all observed dead animals at these locations, whether or not we salvaged the carcasses. All accessible marine mammal carcasses were marked with red surveyor's tape so that carcass would not be mistaken for a recent stranding during subsequent trips. Specimen parts were collected from dead California sea lions including the foreflippers from freshly dead pups for osteological studies (Watson, Stewart, and Ganey, 1986), and teeth for a sex determination study (Lowry and Folk, 1986). Data were recorded on a pinniped life history data form (Appendix I) and entered into the SWFC Pinniped Life History database PINNLIFE.DAT.

Tagging and Resights

We tagged California sea lion pups under the authority of Marine Mammal Protection Act Permit 347 in mid-September of both 1981 and 1982, when the pups were approximately two to three months of age. Six persons participated in the tagging operation on September 10-11, 1981 and September 18-19, 1982. We stalked small groups or herded larger groups against the base of rock cliffs. Animals were then restrained by hand or in hoop nets while they were sexed and tagged after capture. White Dalton Jumbo roto tags were placed on the posterior edge of both foreflippers close to the body. We weighed pups during September

1982. Data on the sex, location, tag number and color, pup weight, and general physical condition were recorded for each animal. We recorded tag information on coding forms and entered these data into a computer database.

We tagged northern elephant seals at Mail Point under the authority of Marine Mammal Protection Act Permit 404 during January-March, 1982. White Dalton Jumbo roto tags were placed in the inter-digit webbing closest to the outer edge of each rear flipper. Tagging of non-pups was performed while the animals were resting and generally resulted in only a single tag being placed on a rear flipper. Tags were placed on both rear flippers of pups. Data on the age-class, sex, location, tag number and color, and physical condition of each animal were recorded. Generally, only one or two people were required to place tags on elephant seals.

We noted resights of previously tagged pinnipeds during each census. Tags were read using either 7 x 50 binoculars, 10 x 50 binoculars, or a 20 x 45 zoom spotting scope. For each tagged animal observed we attempted to record the tag number, color, condition of tag, location of tag (left, right or both flippers) and the animal's age-class, condition, association and behavior. This information was subsequently coded and entered into a computer database.

Other Observations

We noted obvious disturbance to the animals whenever it was observed, as well as evidence of recent foot or vehicular traffic in an area likely to have caused disturbance. We also noted the presence of commercial, private, or military vessels and aircraft. Any occurrence of cetaceans offshore from the study area was also recorded, as was any apparent entanglement of pinnipeds with debris.

RESULTS

Counts and Distribution of Pinnipeds

We conducted twenty ground surveys in the study area during 1981 and 1982. Complete counts were obtained for California sea lions and northern elephant seals during nine of the twenty trips (Table 1). Harbor seals were observed at "The Shack" each of the nine trips we surveyed there, but were rarely seen elsewhere in the study area. No live pinnipeds were observed on the beaches between Seal Cove Point and the "Small Cliffs", "Tiki Head Bridge Beach" and Mail Point, and "Arch Rock" to "The Shack" (Figure 2). The offshore rock we called "The Notch" is located between "Tiki Head Bridge Beach" and Mail Point. A few sea lions were seen there during the summer months, but it is awash at high tide.

Areas outside the study area were occasionally surveyed. On November 17, 1981, a count was obtained of the Northwest Harbor Islet (Figure 1). Using a spotting scope at a distance of approximately 400 meters, we counted 2 pups and 90 non-pup California sea lions. In the same area we counted 80 unclassified California sea lions on May 14, 1982, and 71 unclassified California sea lions on August 22, 1982. On May 14, 1982 we surveyed the rocky shoreline from Eel Point (Figure 1) northward approximately two miles without observing any pinnipeds. No live animals were seen at China Point during a survey conducted on June 12-13, 1982. During five surveys of the rocky shoreline between "The Shack" and Lost Point, we observed only live one harbor seal on April 27, 1982.

California Sea Lions

Numbers of California sea lion pups and non-pups are presented for each of the three sub-areas in Table 1. Figure 4 presents the total numbers of sea lions counted within the study area, for all trips during which a complete count of the area was obtained. We included the mid-May, 1982 count of 697 animals because the disturbance which affected the animals occurred after we had obtained our counts. Figure 5 presents similar data for each of the three sub-areas. Figure 6 shows the ratios of 1982-cohort pups to the total numbers of California sea lions seen in the three sub-areas for the period May through November 1982. The number of adult males maintaining territory were tallied during April, May, June, and July. These counts are presented in Figure 7.

We began our studies after the breeding season in 1981 and thus did not obtain a pup count during the assumed peak of the season in late July 1981. We obtained a count of 666 pups on August 18-19, 1981. The first live pups of the 1982 cohort were observed on May 26, 1982 with peak numbers of pups observed in late July, 1982 (941 pups). A stillborn birth was observed at the west ledge of Mail Point on March 23, 1982. We also observed two

fresh and four semi-fresh pup carcasses (prematures) in late April, 1982. During mid-May 1982, we salvaged seven more premature pups of the 1982 cohort.

Pups were most abundant during late July, 1982 at MP. The percentage of pups for each sub-area were 57.4 % (MP), 28.7% (NMP), and 13.9% (SMP). These percentages are similar to the total numbers of all animals counted in the sub-areas (50.6%, 31.4%, and 18.0%, respectively). By November 1982, Mail Point contained 73.0% of all pups and 62.7% of the animals. NMP had 23.6% of the pups and 26.2% of all animals while SMP accounted for only 3.4% and 11.1%, respectively.

Adult males defending territories were first observed at MP and NMP in late April, 1982. Total numbers increased to a maximum of 42 in mid-July but had decreased to 27 by late July, 1982 (Figure 7). There were more bulls present in SMP than NMP during mid-June, but the opposite was evident by mid-July. NMP accounted for more bulls (20) than MP (18) in mid-July, and during the late-July census (13 and 10, respectively).

Northern Elephant Seals

Elephant seals were observed within the study area at MP and SMP (Table 1). Most animals, and all pups and breeding females, were observed at MP. Elephant seals were most abundant in May (48 animals), none were observed in July and August, and fewer than 18 animals were observed in September and November of both years. We observed a breeding group during January-March of 1982 consisting of a single bull, 2 subadult males, five females, and at least 3 juveniles or yearlings. A total of five pups were born at San Clemente Island during January-February 1982, with only three surviving until they were weaned. Four of the five pups were tagged although one of the tagged pups subsequently died. The fifth pup was observed dead shortly after birth. The observed age-class distribution of elephant seals is presented in Table 2 for all twenty trips.

Harbor Seals

The haulout to the south of Mail Point we called "The Shack", was the only location where we consistently observed these animals (Figures 1-2). We observed harbor seals during each of nine trips we surveyed at "The Shack" (Table 1). We obtained maximum counts there of 32 animals in both late April and late May of 1982, and 27 in mid-May (Table 1). Pups were observed there in late March (2 pups), late April (2 pups), and mid-May (1 pup) of 1982. Two non-pups were seen in the sub-area NMP during March, 1982. We observed one non-pup at MP and another at Seal Cove Point during July, 1982.

California Sea Lion Feeding Habits Study

We collected nine spewings and 431 scats from California sea

lions during 1981-1982 including 126 fresh scats and 305 dry scats (Table 3). The area SMP accounted for most of the samples since we were able to canvass this area during mid-day while the animals were at the water's edge. No prey remains were not found in 64 (14.6%) of the samples and therefore these samples were not included in the PFO analysis. Of all otoliths, beaks and other prey remains which were categorized as either positive or probable identifications, 90.3 % were positively identified (Table 4a), and 9.7% were probable identifications (Table 4b). We identified 15 prey to species, 3 prey to genera, and 6 prey to family. Lowry and Oliver (1986) defined commonly occurring prey as those prey with PFO's of at least 10%. Six prey had a PFO value of at least 10%: Jack mackerel (Trachurus symmetricus), 48.3%; northern anchovy (Engraulis mordax), 36.4%; Market squid (Loligo opalescens), 27.0%; Pacific whiting (Merluccius productus), 18.4%; Pacific mackerel (Scomber japonicus), 15.1%; and rockfish (Sebastes spp.), 14.8% (Table 4a). These six prey constitute 81.9% of all prey that were positively identified in the sample.

Salvage of Dead Marine Mammals

We salvaged 95 California sea lions, 1 harbor seal, 3 unidentified pinnipeds, and 1 common dolphin (Table 5, Appendix II). 74.7% of the sea lion strandings were within the study area and represented 37 pups and 34 non-pups. We observed more strandings of non-pups (52.6%) than pups of the 1981 cohort (22.1%) or pups of the 1982 cohort (25.3%). Dead strandings of non-pups were salvaged on all but two of the twenty trips, ranging in numbers from 1 to as many as 10. Fifty-one of the 71 sea lions (72.9%) were collected between late March and the end of July, 1982. Numbers of dead pups from the 1981 cohort were most abundant in March, 1982 (17 pups), whereas dead pups of 1982 were more abundant in April-May, 1982 (15 pups). The seventeen pup carcasses collected in March, 1982 at MP were dried carcasses representing mortalities which probably occurred during the winter of 1981-1982. We recovered 13 premature specimens from the 1982 cohort during April and early May of the year. None of the animals we salvaged bore tags. 23.2% of the strandings were found between Lost Point and "The Shack". Two California sea lions and one harbor seal were salvaged at China Point. Three pinniped strandings were not identified to species due to decomposition. A single common dolphin (Delphinus delphis), was salvaged in the study area during July, 1982.

Tagging and Resights

We double-tagged 71 1981-cohort, California sea lion pups on September 10-11, 1981 (Appendix III). This represents 10.7% of the 666 pups counted during the pup count on August 18-19, 1981. More males (55%) were captured and tagged than females (45%) (Table 6), and all animals were categorized as in good condition. All tagging occurred in the MP area where California

sea lion pups were most accessible and abundant. "Big Pool" (Figure 3) was particularly conducive to the capture and tagging of greater numbers of sea lion pups, especially during a low tide. During early November, 1981, we counted 323 pups and obtained resights of 15 tagged animals representing 4.6% of the pup count (Tables 1 and 7). In April, 1982 the percentage of tagged pups was 4.0% (4 tagged pups / 101 total pups), and in late May 15.6% (5 tagged pups / 32 total pups). Four of our tagged males were observed alive on the Farallon Islands, California during September and October 1982 (Huber et al., 1983). These sightings occurred 375-405 days after tagging and represent a linear distance of travel of 363 nautical miles. One other male was reported at Ano Nuevo Island on December 18, 1982, 464 days after being tagged. A dead male was recovered, 320 days after having been tagged, near Carmel, California on July 27, 1982. These latter two sightings were 315 and 278 nautical miles north of San Clemente Island. Two other males and one dead female from the 1981 cohort were observed along the southern California shoreline during 1982, between 252 and 285 days after tagging and at distances of 54 to 89 nautical miles from San Clemente Island.

Eight northern elephant seals were either single or double-tagged between January 27 and March 24, 1982 at the MP area (Appendix IV). The age-classes of elephant seals tagged included 4 of the 5 pups born at San Clemente Island, 2 yearlings, and 2 adults (Table 6). None of the tagged elephant seals were seen at SCI after April 27, 1982. The unique resights we observed are shown in Table 7.

We double-tagged 134 1982-cohort California sea lion pups on September 18-19, 1982 (Appendix V). This represents approximately 14% of the 941 pups counted during the peak pup count in July. More females (54%) were captured and tagged than males (46%). We weighed 116 of the 134 pups which we tagged (Table 6). The mean weight of male pups was 21.5 kg (N=54, SD=3.6) and was higher than the mean female weight of 18.8 kg (N=62, SD=2.9). These mean weights are significantly different using a t-test for samples with unequal variances ($T_{0.05, 104}=4.496$, $P<0.001$). During November, 1982 we observed a percentage of tagged pups to total pups of 10.4% (61 tagged pups / 588 total pups), and during December 8.7% (50 tagged pups / 576 total pups).

Other Observations

Disturbance Factors

The dirt road leading into our study area was very rough, and often impassable during or after a storm. There are three gates on this road, one of which is locked, and access to the area is restricted by base regulations. Despite these obstacles, we noted evidence of vehicular traffic within the area, including tire tracks on the haulouts to the north and south of Mail Point, as well as the rookery itself. From conversations with island personnel, this area is visited by persons desiring to fish along

the rocky shoreline or those wanting a closer view of the pinnipeds. The coastline was also visited by both commercial and private sportfishing vessels, and commercial abalone and lobster fisherman. We observed all of the above within a few hundred meters of the haulouts and rookery. On more than one occasion we observed lobster fishermen pulling traps within ten meters of animals on the rookery, and commercial abalone divers working in chest deep water near the haulouts. We also observed low-flying aircraft (helicopters, prop and jet) flying over the haulouts and rookery at altitudes often less than a few hundred feet.

We did not observe any apparent effect from the presence of vessels, even those which approached very close to the animals. Low altitude passes by aircraft alerted the animals, but they appeared to recover quickly if only a single pass occurred. On the occasions when multiple passes were observed, many of the animals entered the water and remained there for some time. On only one occasion did we observe someone attempting to approach the animals on land. This individual strolled about the rookery at Mail Point, and resulted in virtually all the animals entering the water during mid-June after we had censused the area. On other occasions we observed tire tracks on both the rookery and haulouts, but were not witness to the effect of these transgressions.

Cetaceans

Although we were not specifically looking for cetaceans, we did note the presence of any observed. On November 4, 1982, we observed two humpback whales, Megaptera novaeangline, breach repeatedly no more than one mile offshore from Tiki Head Bridge Beach (Figure 2). A single common dolphin (Delphinus delphis) was salvaged just north of MP on July 27, 1982.

Entanglements

We observed an adult female California sea lion with a scar encircling the neck on April 27, 1982 at MP. The next day we observed an animal with an encircling neck scar in the sub-area SMP. A similar observation was made on May 26, 1982 at MP. We are uncertain if these observations were of the same animal, but the wounds appeared to have resulted from an entanglement with some type of debris. The separate sightings on April 27 and April 28, 1982 may have been the same animal in which case the percentage of the total number of sea lions for which we observed an entanglement would be 0.07%. The rate would be 0.14% if these were different animals. The single animal we observed on May 26, 1982 reflects a 0.12% entanglement rate at San Clemente Island for the May trip.

DISCUSSION

Counts and Distribution of Pinnipeds

California Sea Lions

Previous counts of California sea lions at San Clemente Island were conducted by the California Department of Fish and Game and others (Bonnot and Ripley, 1948; Ripley et al., 1962; Carlisle and Alpin, 1971; Odell, 1971; Bonnel et al., 1978). These counts ranged from a high of 3,820 in 1964 (Odell 1971) to a low of 251 in 1928 (Bonnot 1928). Cohen (1979) reported seasonal highs of "around 1800" animals in the summer to lows of "less than 1000" in the fall for the period April, 1976 through June, 1977. He reported 671 pups during the 1976 breeding season. Recent reports indicate that the windward shoreline between Seal Cove Point and Lost Point is the area inhabited by most of the California sea lions (Bonnel et al. 1978, Cohen 1979). Bonnel et al. (1978) also reported the presence of small numbers of sea lions at San Clemente Island during 1975-1978 at 1) Pyramid Cove, 2) China Point, and 3) Castle Rock (Figure 1). With the exception of Castle Rock, where up to 18 animals were counted, these other sightings involved only 1 or 2 animals. Cohen (1979) also reported China Point and Castle Rock as sea lion haulouts as well as the Northwest Harbor Islet, but did not present counts.

The number of animals in the study area varied greatly during the year. A minimum of 697 animals were counted in May, 1982 and a maximum of 2,245 animals were counted in February, 1982 (Table 1, Figure 4). Counts were lower during the fall and early winter of both 1981 and 1982, and were substantially higher in February, 1982. The February increase was quickly followed by a decline during March-April to the May, 1982 low. Numbers then increased sharply as pupping and breeding occurred, reaching a maximum of 2,221 animals (941 pups) in late July of 1982. The incomplete counts at Mail Point reflect our inability to count animals on the seaward ledges at the Point unless we ascended the Point. Although these counts were incomplete, they indicate minimum numbers for the MP area. We estimate that at certain times of the year there could be as many as 200 animals on the seaward edges of Mail Point. Our incomplete counts at MP could be low by this estimate.

While we were unable to always obtain a complete count in the MP area, we usually obtained complete counts for the sub-areas to the south (SMP) and north (NMP). The total counts for these sub-areas show trends similar to that at MP, but with fewer animals (Figure 5). NMP more closely followed the trend at MP. SMP contained the fewest animals in the fall of 1981, and during the late summer though early fall of 1982. This area maintained the early February increase exhibited in all three sub-areas through late April, while the MP and NMP sub-areas showed rapid declines. Following the breeding season of 1982, SMP showed a rapid decline in the total number of animals to a substantially

lower number than the other two areas. Although we did not obtain counts for all sex and age-classes, we noted the presence throughout the year of more sub-adult males and juveniles at SMP than at either MP or NMP.

Pupping occurred in all three sub-areas and pups were found in these areas throughout the year. MP contributed most to the number of pups counted on the island in late July, followed by NMP and SMP. While there were declines between the July and November counts of both pups (941 vs. 588) and non-pups (1280 vs. 875), the ratio of pups to non-pups (Figure 6) remained about the same for MP (0.48 vs. 0.47) and NMP (0.39 vs. 0.36). The sub-area SMP exhibited a substantial decline in this ratio (0.33 vs. 0.12). While this latter change could be attributed to either higher pup mortality or more frequent sojourns to sea by pups from the SMP sub-area, we feel it may indicate immigration of non-pups from areas other than San Clemente Island during the fall and winter. These data also suggest that NMP may be more important to the reproductive capacity of the island than SMP, as evidenced by the more rapid increase in number of pups during June, and the maintenance of a higher ratio of pups to non-pups during the fall as the total number of animals decreased. SMP exhibited a much slower increase in number of pups and showed a much smaller ratio of pups to non-pups as early as September (Figure 6).

There were a minimum of 941 pups born during 1982 because there were surely deaths prior to, and births after, the late-July count. We calculated a ratio of 22 parous females to territorial males, using 941 as the number of breeding females and our maximum count of 42 territorial males.

The Northwest Harbor Islet (Figure 1) is also used by California sea lions as a haulout, and possibly a rookery. Bonnel et al. (1978) reported less than 100 animals on the islet during the breeding season and between 350-450 during the winter and spring from data collected during aerial surveys during 1975-1978. Cohen (1979) also identified the islet as a haulout but did not provide counts. While we were unable to survey the islet during late July, we believe its contribution to the total number of sea lions (both pups and non-pups) is very small in comparison with our study area. The two pups observed on the islet in early November 1981 may have been born on the islet, but could have moved there from another area. Our counts for the Northwest Harbor Islet during November, 1981 (92 animals) May, 1982 (80 animals), and August, 1982 (71 animals) could be used with the study area counts to obtain an estimate of the total island population during the breeding season.

Bonnel et al. (1978) estimated 50,000 California sea lions within southern California waters. LeBoeuf and Bonnell (1980) estimated the minimum number of animals at between 45,000 to 60,000 animals. LeBoeuf et al. (1983) estimated the total U.S. and Mexican population at 145,000 animals. We estimate at least 2,292 animals inhabited San Clemente Island during the breeding

season in the summer of 1982, and as few as 777 at other times of the year. The maximum estimate results from our late July count within the study area and the August count at the Northwest Harbor Islet (71 animals). The minimum estimate results from the May 1982 count within the study area and the 80 animals counted at the Northwest Harbor Islet. Peak numbers of pups were reported for 1975-1977 (608, 413, and 351 respectively) in DeMaster et al. (1982), with the time period during which these counts were obtained varying between June to early August. Cohen (1979) reported 671 pups during the 1976 breeding season. Our count of 666 in mid-August of 1981 and a late July count of 941 in 1982, indicate a significant increase in the pup production at the island.

Northern Elephant Seals

Elephant seals counts at San Clemente Island have ranged from zero on February 13, 1964 (Odell 1971) to 223 on April 19, 1977 (Bonnell et al. 1978). Cohen (1979) reported a maximum count of 219 animals between Mail Point and Lost Point on April 17, 1977. LeBoeuf and Mate (1977) reported the first observed pup born on San Clemente Island in this century during early January, 1977. A second pup was reported later in January 1977 (Bonnell et al. 1978). They indicated that no pups were apparently born during 1978.

We found maximum numbers of elephant seals within our study area, primarily at Mail Point, during April (48) and May (39) of 1982. We only observed one adult male defending a group of females at MP during January and February of 1982. Five pups were born at Mail Point during January and February of 1982, with three of these surviving at least through weaning. These animals utilized a narrow, cobblestone beach on the south side of Mail Point, and an elevated dirt area immediately adjacent to the beach. One pup was observed shortly after birth on the cobblestone beach during a low tide and not seen subsequently. A different pup, less than a week old, was observed in the same location on another day but not seen again. The three pups which survived though weaning were all observed on a dirt area above the beach. We speculate that pups born on the elevated dirt area, or on the cobblestone beach and not subjected to tidal extremes or heavy surf conditions until they are able to ascend the berm to the dirt, are most likely to survive.

Harbor Seals

Bonnell et al. (1978) reported a maximum count of 64 harbor seals at San Clemente Island during an aerial census on August 4, 1975, but generally fewer than 40 animals were seen during aerial surveys conducted at various times during 1975-1978. No sightings were reported by them within our study area. Animals were reported at the south and north ends of the island, and along the southwest shoreline south of Lost Point (Figure 1). Three sightings of pups were reported: August 1976, and March of 1977 and 1978, with a maximum count of 6 pups observed on March 11,

1977 (Bonnel et al., 1978). Cohen (1979) reported similar observations for the period April 1976 to June 1977, with the highest number (104) seen between Lost Point and China Point on May 7, 1977. This number included 2 pups. He reported sighting seals at Mail Point and estimated 100-200 harbor seals may be using San Clemente Island as a haulout.

On every occasion we were able to survey the haulout at "The Shack" we observed harbor seals, and therefore conclude they used this area as a regular haulout. Pupping also occurs there as evidenced by the 2 pups we observed during March and April of 1982. They were infrequently seen elsewhere in the study area. We did not regularly survey areas where harbor seals had previously been observed which were outside our study area, and therefore cannot estimate the extent to which these animals may be utilizing the entire island.

California Sea Lion Feeding Habits

Our analyses of the scats and spewing collected at San Clemente Island identified six prey (5 fish and 1 squid species) which were commonly found in the samples, and accounted for 81.9% of all the prey items we were able to identify. These six prey were: Jack mackerel, northern anchovy, market squid, Pacific whiting, Pacific mackerel, and rockfish. We identified many other prey but these occurred in less than 10% of our samples. Our findings are consistent with previous reports on food consumption by California sea lions (Bonnot, 1928; Sheffer and Neff, 1948; Fiscus and Baines, 1966). A detailed review of our California sea lion feeding habits study is presented in Lowry and Oliver (1986). It includes the data collected at San Clemente Island during the period of this report as well as data collected afterwards. Our findings, as well as subsequent analyses over a longer period, indicate that California sea lions feed upon a wide variety of small fish and cephalopods, but depend upon a relative few for nourishment.

Salvage of Dead Marine Mammals

The shoreline at San Clemente is mostly rock and cobblestone beaches, many of which are awash during higher tides or heavy seas. There are no sand beaches within the study area. The animals, with few exceptions, inhabit the shoreline within 10 meters of the water. It is possible that dead animals are washed to sea during higher tides and storms. This geography, coupled with our reluctance to disturb the animals during censuses, means our salvage totals are minimum numbers. During our beach surveys between "The Shack" and Lost Point, we generally salvaged between 1 and 5 non-pup sea lions. No live sea lions were observed. We speculate that the prevailing ocean currents deposited these specimens in this area after they had died at sea or within the study area to the north.

Tagging and Resights

1981-cohort California sea lions

We did not obtain a complete pup count for our study area while tagging 71 California sea lion pups in mid-September, 1981, but counted 194 pups in the Mail Point area. If we assume the 666 pups, counted in mid-August, represents the maximum present during September, we tagged 10.7% of the pups. This percentage is probably low because there were probably more deaths than births between the August pup count and the September tagging. The observed decline in the percentage of tagged pups to total pups between September 1981 (10.7%) and April 1982 (4.0%) may indicate (1) a higher mortality of tagged pups, (2) some behavioral change induced by the tagging experience resulting in tagged pups being away from the island more often than untagged pups, (3) an influx of untagged pups from other rookeries, or (4) our inability to discern tagged animals. The increase in this percentage in late May (15.6%) could have resulted from our inability to properly categorize 1981-pups and yearlings, or by an exodus of weaned 1981-pups as the breeding season developed, or both.

Evidence of movement away from the island by weaned pups is suggested by the sightings of four yearlings at the Farallon Islands during September and October of 1982. These yearlings had previously been captured, tagged, and released at SCI during September, 1981. None of the animals sighted off San Clemente Island were subsequently seen at San Clemente Island. These data are consistent with reports of a northward migration of young males during the fall (Bartholomew, 1967).

1982-cohort California sea lions

Our count of 569 pups while tagging in mid-September of 1982 did not include all of the Mail Point area, but is a better estimate of the number alive in September than the late July count of 941 animals. We tagged 23.6% of the pups (134 pups tagged / 569 total pups). The decrease in the ratio of tagged to untagged pups which occurred between September (14.6%) and November (10.4%) is similar to what we observed during the fall of 1981.

Other Observations

Disturbance

We observed a number of disturbances within the vicinity of the pinnipeds. These were primarily the result of (1) commercial and private fishing vessels operating in the shallow waters immediately offshore from the haulouts and rookery, (2) low altitude passes by military aircraft, and (3) unauthorized personnel approaching the animals from land. It is difficult to say what the long term effects of these types of disturbance may

be. However, repeated stampedes during the breeding season may increase pup mortality due to trampling or abandonment. We suggest that island managers continue their efforts to limit access to this area, especially during the months of May-October. Education of the island personnel and naval aviators as to the effects of their activities may also help. Finally, the managers should attempt to solicit the California Department of Fish and Game to enforce existing regulations governing commercial and sport fishing at San Clemente Island.

Cetaceans

With the exception of the single observation of two humpback whales, we saw no evidence that cetaceans are present in the nearshore waters (less than 1 nautical mile) off our study area.

Entanglement

We observed three California sea lions with obvious scars from an entanglement with some debris. We did not observe any apparent mortality from these scars encircling the necks of the animals. We calculated the entanglement rate for California sea lions at no greater than 0.14%, which may indicate a relative low level of debris in the immediate vicinity of the island.

ACKNOWLEDGEMENTS

We would like to thank Jan Larson (Staff Civil Engineer, Natural Resources Program, Dept. of Navy) for logistical support during our field activities, Tony Guerro and Dave Butler (the Transportation Department) for the use of Navy vehicles in the field, and Ted Vankirk and Bob Hodges (Dept. of Navy) for alleviating logistic problems associated with access to our study site. We are also grateful to the many persons (SWFC, Southwest Region-NMFS, Staff Civil Engineer, and contracted personnel) who assisted in the field during pinniped surveys and tagging: J. Anderson, L. Buck, R. Charter, D. Clapp, J. Coe, D. DeMaster, S. Feldcamp, L. Ferm, T. Gerrodette, L. Hansen, D. Holts, V. Kirby, K. Nicolson, S. Paez, D. Pfirrmann, R. Phillips, D. Seagars, R. Wild, and S. Zeiss. Lisa Ferm assisted on many of the trips. Jeanne Wexler assisted with the compilation of some of the tables and appendices. We thank Roy Allen for his illustrative services and Cliff Ratcliffe for final preparation of this manuscript.

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Table 1. Numbers and distribution of pinnipeds within the study area between "The Shack" and Seal Cove Point at San Clemente Island, by data collection period, during 1981-1982.

Trip Period Date Location ¹		CALIFORNIA SEA LIONS					NORTHERN ELEPHANT SEALS		HARBOR SEALS	
		1981 1982			Unknown	Total	1982		1982	
		Pups	Pups	Non-pups	Category	Number	Pups	Non-pups	Pups	Non-pups
8/18-19/81	SMP	16	-	274	0	290	0	0	-No Count-	
	MP	510	-	554	0	1064	0	0	0	0
	NMP	140	-	224	0	364	0	0	0	0
	Totals	666	-	1052	0	1718	0	0	?	?
9/9-11/81	SMP ²	-No Count-					-No Count-		-No Count-	
	MP ²	194	-				0	0	0	0
	NMP ²	-No Count-					-No Count-		-No Count-	
10/14-15/81	SMP	55	-	2	0	77	0	0	-No Count-	
	MP	188	-	289	0	477	0	15	0	0
	NMP ²	30	-	?	?	30	0	0	0	0
	Totals ²	273	-	291	0	584	0	15	?	?
11/13-17/81	SMP	1	-	2	0	3	0	0	-No Count-	
	MP	232	-	583	0	815	0	16	0	0
	NMP	90	-	148	0	238	0	0	0	0
	Totals	323	-	733	0	1056	0	16	?	?
1/19-21/82	SMP ²	-No Count-					-No Count-		-No Count-	
	MP ²	23	-	161	367	551	1	8	0	0
	NMP ²	-No Count-					-No Count-		-No Count-	
	Totals ²	23	-	161	367	551	1	8	?	?
1/27-29/82	SMP	?	-	?	344	344	0	1	0	14
	MP ²	39	-	69	307	415	3	8	0	0
	NMP ²	?	-	?	153	153	0	0	0	0
	Totals ²	39	-	69	804	912	3	9	0	14

¹SMP - "The Shack" to Mail Point (3.0 km of coastline).

MP - Mail Point area (0.5 km of coastline).

NMP - Mail Point to Seal Cove Point (4.0 km of coastline).

²Incomplete count for area or trip.

³Counts may be biased due to observation, or evidence, of human disturbance.

Table 1. continued

Trip Period Date Location ¹		CALIFORNIA SEA LIONS					NORTHERN ELEPHANT SEALS		HARBOR SEALS	
		1981 Pups	1982 Pups	Non-pups	Unknown Category	Total Number	1982 Pups	Non-pups	1982 Pups	Non-pups
2/3-5/82	SMP	92	-	481	0	573	0	1	0	23
	MP	333	-	742	0	1075	4	9	0	0
	NMP	52	-	369	176	597	0	0	0	0
Totals		477	-	1592	176	2245	4	10	0	23
2/9-11/82	SMP ²	-No Count-					-No Count-		-No Count-	
	MP	47	-	205	60	312	3	7	0	0
	NMP	113	-	806	0	919	0	0	0	0
Totals ²		160	-	1011	60	1231	3	7	?	?
3/23-24/82	SMP	?	-	?	487	487	0	0	2	8
	MP	140	-	474	100	714	3	6	0	0
	NMP	75	-	267	0	342	0	0	0	2
Totals		215	-	741	587	1543	3	6	2	10
4/27-29/82	SMP	28	0	555	0	583	0	0	2	30
	MP	36	0	369	157	562	1	47	0	0
	NMP	37	0	196	0	233	0	0	0	0
Totals		101	0	1120	157	1378	1	47	2	30
5/13-14/82	SMP ³	?	?	?	154	154	0	1	1	26
	MP ³	8	?	70	391	469	0	38	0	0
	NMP ³	?	?	3	71	74	0	0	0	0
Totals ³		8	?	73	616	697	0	39	1	26
5/26-28/82	SMP	4	2	353	0	359	0	0	0	32
	MP	15	11	362	0	388	0	15	0	0
	NMP	13	2	107	0	122	0	0	0	-0
Totals		32	15	822	0	869	0	15	0	32

Table 1. continued

Trip Period Date Location ¹		CALIFORNIA SEA LIONS				NORTHERN ELEPHANT SEALS		HARBOR SEALS		
		1981 Pups	1982 Pups	Non-pups	Unknown Category	Total Number	1982 Pups	Non-pups	1982 Pups	Non-pups
6/11-14/82	SMP	-	42	428	275	745	0	0	-No Count-	
	MP ²	-	241	410	0	651	0	7	0	0
	NMP ²	-	7	36	0	43	0	0	0	0
	Totals ²	-	290	874	275	1439	0	7	?	?
6/29/-7/1/82	SMP	-	125	475	0	600	0	0	1	20
	MP ²	-	442	280	0	722	0	1	0	0
	NMP	-	206	300	0	506	0	0	0	0
	Totals ²	-	773	1055	0	1828	0	1	1	20
7/13-14/82	SMP	-	103	538	0	641	0	0	-No Count-	
	MP ²	-	253	373	0	626	0	0	0	0
	NMP	-	201	415	0	616	0	0	0	0
	Totals ²	-	557	1326	0	1883	0	0	?	?
7/27-29/82	SMP	-	131	269	0	400	0	0	0	6
	MP	-	540	584	0	1124	0	0	0	1
	NMP	-	270	416	11	697	0	0	0	1
	Totals	-	941	1269	11	2221	0	0	0	8
8/20-23/82	SMP	-	68	109	0	177	0	0	-No Count-	
	MP ²	-	248	338	0	586	0	0	0	0
	NMP	-	99	281	0	380	0	0	0	0
	Totals ²	-	415	728	0	1143	0	0	?	?
9/15-20/82	SMP	-	26	120	0	146	0	0	-No Count-	
	MP ²	-	362	534	0	896	0	4	0	0
	NMP	-	181	208	0	389	0	0	0	0
	Totals ²	-	569	862	0	1431	0	4	?	?

Table 1. continued

		CALIFORNIA SEA LIONS					NORTHERN ELEPHANT SEALS		HARBOR SEALS	
Trip Period		1981 1982		Unknown	Total	1982		1982		
Date	Location ¹	Pups	Pups	Non-pups	Category	Number	Pups	Non-pups	Pups	Non-pups
11/2-5/82	SMP	-	20	143	0	163	0	0	0	14
	MP	-	429	488	0	917	0	18	0	0
	NMP	-	139	244	0	383	0	0	0	0
	Totals	-	588	875	0	1463	0	18	0	14
12/28-30/82	SMP	-	155	337	0	492	0	0	-No Count-	
	MP ²	-	254	224	0	478	0	15	0	0
	NMP	-	167	133	0	300	0	0	0	0
	Totals ²	-	576	694	0	1270	0	15	?	?

Table 2. Observed age class distributions for northern elephant seals within the study area at San Clemente Island, by collection period, during 1981-1982.

Trip Period Date	Unclassified	Adult Male	Adult Female	Subadult	Juvenile/ Yearling	Pup	Total
08/18-19/81							0
09/09-11/81							0
10/14-15/81				3	12		15
11/13-17/81					16		16
01/19-21/82		1	4		3	1	9
01/27-29/82		2	5		2	3	12
02/03-05/82		3	5		2	4	14
02/09-11/82		2	4		1	3	10
03/23-24/82			3	3		3	9
04/27-29/82	47					1	48
05/13-14/82	39						39
05/26-28/82		5			10		15
06/11-14/82				4	3		7
06/29-7/1/82					1		1
07/13-14/82							0
07/27-29/82							0
08/20-23/82							0
09/15-20/82					4		4
11/02-05/82				1	17		18
12/28-30/82					15		15

Table 3. Numbers of California sea lion scats and spewings collected within the study area at San Clemente Island, by collection period, during 1981-1982.

Trip Period Date	Area of Collection ¹	NUMBER OF SCATS AND SPEWINGS COLLECTED			
		Fresh Scats	Dry Scats	Spewings	Totals
09/09-11/81	MP	4	3	0	7
10/14-15/81	MP	11	14	0	25
11/13-17/81	MP	7	9	0	16
01/27-29/82	MP	0	3	0	3
03/23-24/82	MP	1	44	0	45
04/27-29/82	MP, SMP	14	54	0	68
05/13-14/82	MP	0	4	0	4
05/26-28/82	MP, SMP	12	31	0	43
06/29-7/1/82	MP, SMP	25	33	0	58
07/13-14/82	SMP	15	1	0	16
07/27-29/82	MP, SMP	21	36	0	57
08/20-23/82	SMP	15	4	0	19
11/02-05/82	SMP	1	53	2	56
12/28-30/82	MP, SMP	0	16	7	23
TOTALS		126	305	9	440

¹SMP - "Arch Rock" to Mail Point (1.4 km of coastline).

MP - Mail Point Area (0.5 km of coastline).

Table 4a. Positively identified prey found in 376 California sea lion scats and 9 spewings collected within the study area at San Clemente Island during 1981-1982. Data are presented for the number and percent frequency of occurrence (PFO) from all samples in which a prey item was recovered.

PREY		Number of	PFO
Scientific Name	Common Name	Occurrences for Total Sample N	for Total Sample %
<u>Trachurus symmetricus</u>	Jack mackerel	186	48.3
<u>Engraulis mordax</u>	Northern anchovy	140	36.4
<u>Loligo opalescens</u>	Market squid	104	27.0
<u>Merluccius productus</u>	Pacific whiting	71	18.4
<u>Scomber japonicus</u>	Pacific mackerel	58	15.1
<u>Sebastes spp.</u>	Rockfish	57	14.8
*Unidentified fish spp.		39	10.1
<u>Chromis punctipinnis</u>	Blacksmith	36	9.4
<u>Onychoteuthis</u>			
<u>boreali-japonicus</u>	Squid	12	3.1
*Unidentified cephalopod			
spp.	Squid and octopus	10	2.6
Unidentified flatfish		7	1.8
<u>Gonatus sp.</u>	Squid	4	1.0
<u>Oxyjulis californica</u>	Senorita	4	1.0
Unidentified fish tooth		4	1.0
<u>Cymmatogaster aggregata</u>	Shiner surfperch	2	0.5
ATHERINIDAE	Silversides	2	0.5
MYCTOPHIDAE	Lanternfish	2	0.5
EMBIOTOCIDAE	Surfperches	2	0.5
LABRIDAE	Wrasses	2	0.5
<u>Octopus sp.</u>	Octopus	1	0.3
<u>Mastigoteuthis</u>			
<u>pyrodes</u>	Squid	1	0.3
<u>Mastigoteuthis</u>			
<u>dentata</u>	Squid	1	0.3
<u>Octopodoteuthis</u>			
<u>deletron</u>	Squid	1	0.3
GONATIDAE	Squid	1	0.3
COTTIDAE	Sculpins	1	0.3
<u>Atherinops affinis</u>	Topsmelt	1	0.3
<u>Chilara taylori</u>	Spotted cuskeel	1	0.3
<u>Zalembeus rosaceus</u>	Pink surfperch	1	0.3
Cartilaginous fish			
vertebrate		1	0.3
TOTAL NUMBER OF OCCURRENCES		752	

*Unidentified species not included in Table 4b.

Table 4b. Probable prey identifications found in 376 California sea lion scats collected within the study area at San Clemente Island during 1981-1982. Data are presented for the number and percent frequency of occurrence (PFO) from all samples in which a prey item was recovered.

PREY		Number of Occurrences for Total Sample N	PFO for Total Sample %
Scientific Name	Common Name		
<u>Engraulis mordax</u>	Northern anchovy	24	6.4
<u>Trachurus symmetricus</u>	Jack mackerel	21	5.6
<u>Loligo opalescens</u>	Market squid	13	3.5
<u>Sebastes spp.</u>	Rockfish	8	2.1
<u>Merluccius productus</u>	Pacific whiting	6	1.6
<u>Onychoteuthis</u> <u>borealijaponicus</u>	Squid	3	0.8
<u>Chromis punctipinnis</u>	Blacksmith	2	0.5
<u>Gonatus sp.</u>	Squid	2	0.5
<u>Abraliopsis felis</u>	Squid	1	0.3
<u>Abraliopsis falco</u>	Squid	1	0.3
TOTAL NUMBER OF OCCURRENCES		81	

Table 5. Summary of dead strandings of marine mammals observed at San Clemente Island during 1981-1982. Unless otherwise noted, all strandings were California sea lions.

Trip period Dates	SEAL COVE POINT TO THE SHACK (Principal study area)			THE SHACK TO LOST POINT			CHINA POINT			TOTALS		
	1981 Pups	1982 Pups	Unid. Non-Pup Pinniped	1981 Pups	1982 Pups	Unid. Non-Pup Pinniped	1981 Pups	1982 Pups	Non-Pup	1981 Pups	1982 Pups	Unid. Non-Pup Pinniped
10/14-15/81	0	-	3							0	-	3
11/13-17/81	1	-	4							1	-	4
01/19-21/82	0	-	1							0	-	1
01/27-29/82	0	-	0			1				0	-	1
02/03-05/82	0	-	2			0				0	-	2
02/09-11/82		NOT SURVEYED										
03/23-24/82	17	-	4							17	-	4
04/27-29/82	0	6	2							0	6	2
05/13-14/82	0	7	0			1				0	7	1
05/26-28/82	0	2	4							0	2	4
06/11-15/82 ^{1,2}	0	0	0							0	0	0
06/29-07/01/82 ¹	0	1	3				1		1	0	0	1
07/13-14/82 ¹	0	0	1							0	0	1
07/27-29/82 ³	1	1	2							1	1	2
08/20-23/82 ¹		NOT SURVEYED				1				0	0	1
09/15-20/82 ¹	0	0	3			5				0	0	3
11/02-05/82	0	1	5							0	1	5
12/28-30/82 ¹	0	0	0							0	0	0
TOTALS	19	18	34	1	6	15	1	0	1	21	24	50
			1			2						3

¹ Incomplete count for area or trip.

² In addition to dead California sea lion strandings, one dead harbor seal (*Phoca vitulina richardsi*) was also observed at China Point.

³ In addition to dead California sea lion strandings, one dead common dolphin (*Delphinus delphis*) was also observed at Mail Point.

Table 6. Numbers of California sea lions and northern elephant seals tagged on San Clemente Island during 1981-1982. Data also presents mean weights of California sea lion pups tagged in 1982.

CALIFORNIA SEA LION PUPS (TAG SERIES 1-71 and 81-216)

Sex	Number of Tagged 1981 Pups	Number of Tagged 1982 Pups	Mean Weight of 1982 Pups	SD
Males	39 (55%)	62 (46%)	21.5 kg (N=54)	3.6
Females	32 (45%)	72 (54%)	18.8 kg (N=62)	2.9
Total	71	134	20.0 kg (N=116)	3.5

NORTHERN ELEPHANT SEALS (TAG SERIES 72-79)

Sex	1982 Pups	Yearlings	Adults	Totals
Males	1	0	1	2
Females	1	0	1	2
Unsexed	2	2	0	4
Totals	4	2	2	8

Table 7. Unique resights of San Clemente Island-tagged California sea lions and northern elephant seals within the study area at San Clemente Island, by month, during 1981-1982.

Month/Year	CALIFORNIA SEA LIONS				NORTHERN ELEPHANT SEALS	
	1981 Pups		1982 Pups		Tags Read	Tags Unread
	Tags Read	Tags Unread	Tags Read	Tags Unread		
Oct 1981	34	4	-	-	-	-
Nov 1981	15	0	-	-	-	-
Jan 1982	29	0	-	-	0	0
Feb 1982	0	0	-	-	2	0
Mar 1982	0	0	-	-	2	0
Apr 1982	1	3	-	-	1	1
May 1982	5	0	-	-	0	0
June 1982	0	0	-	-	0	0
July 1982	2	1	-	-	0	0
Aug 1982	0	1	-	-	0	0
Sept 1982	0	0	-	-	0	0
Oct 1982	- NO TRIP -					
Nov 1982	0	0	59	2	0	0
Dec 1982	0	0	49	1	0	0

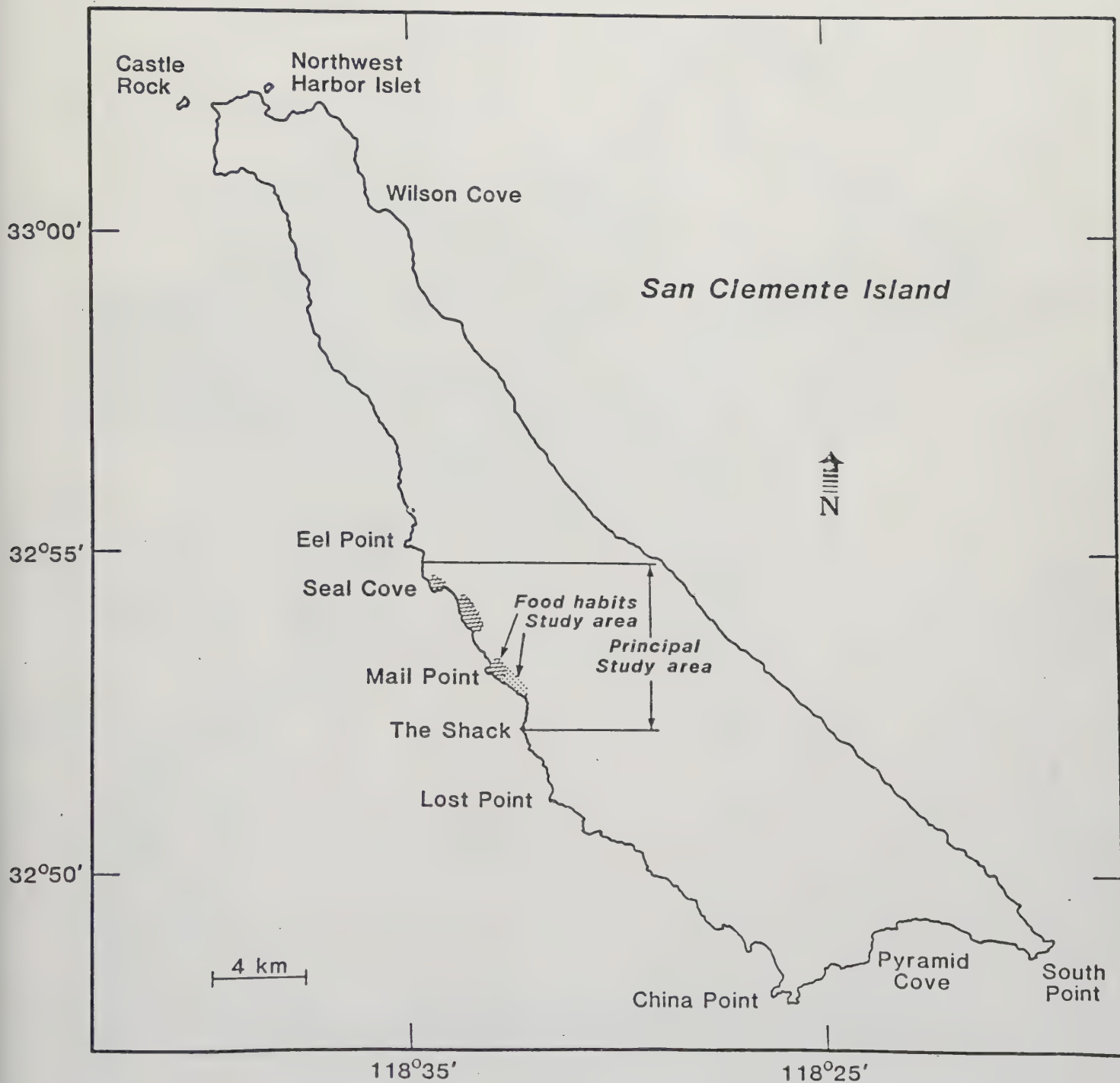


Figure 1. Map of San Clemente Island showing the study area. Observed breeding areas are indicated by crosshatch. Areas used primarily as haulouts are indicated with stipple.

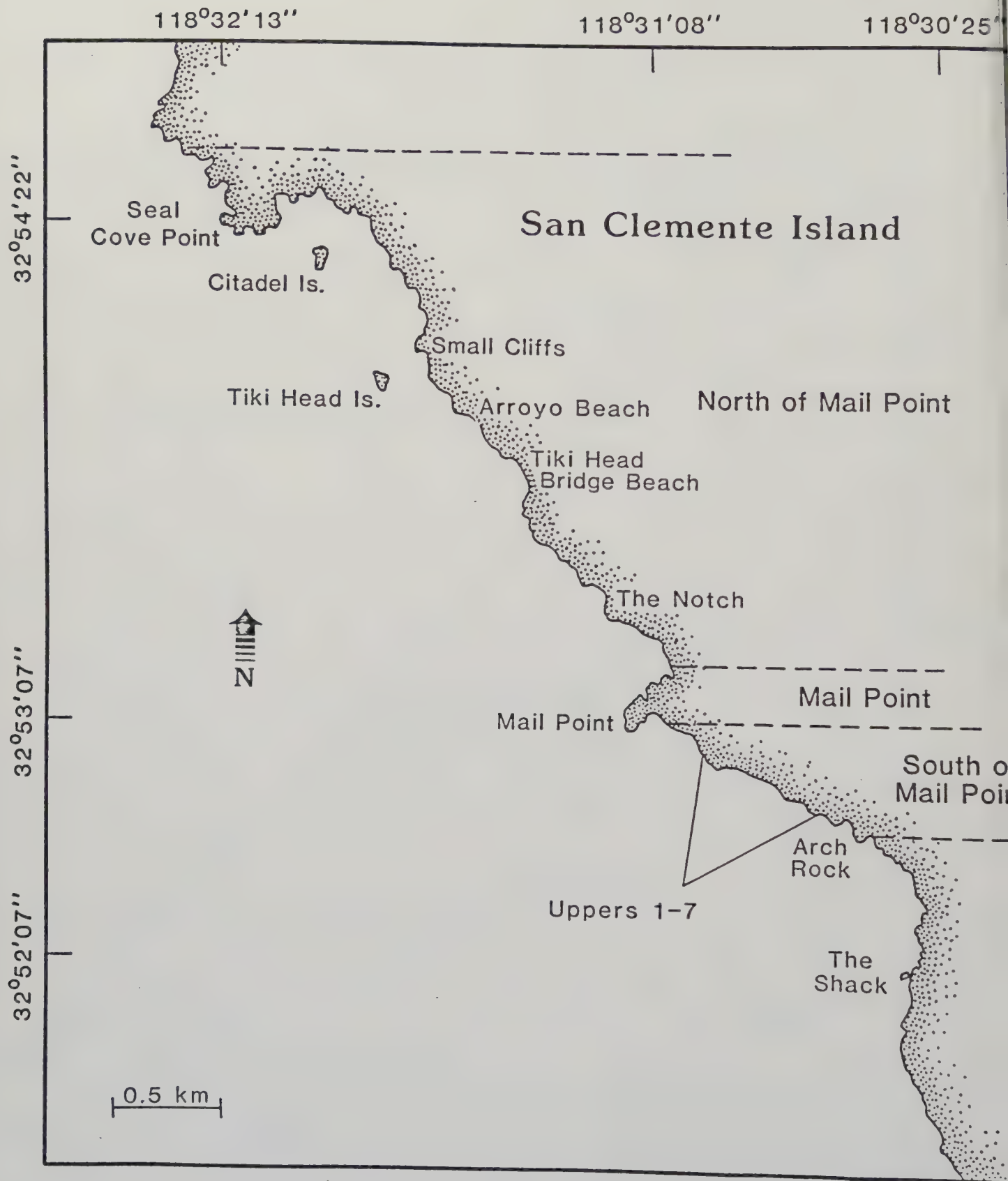


Figure 2. San Clemente Island pinniped study area indicating the locations of the three sub-areas.

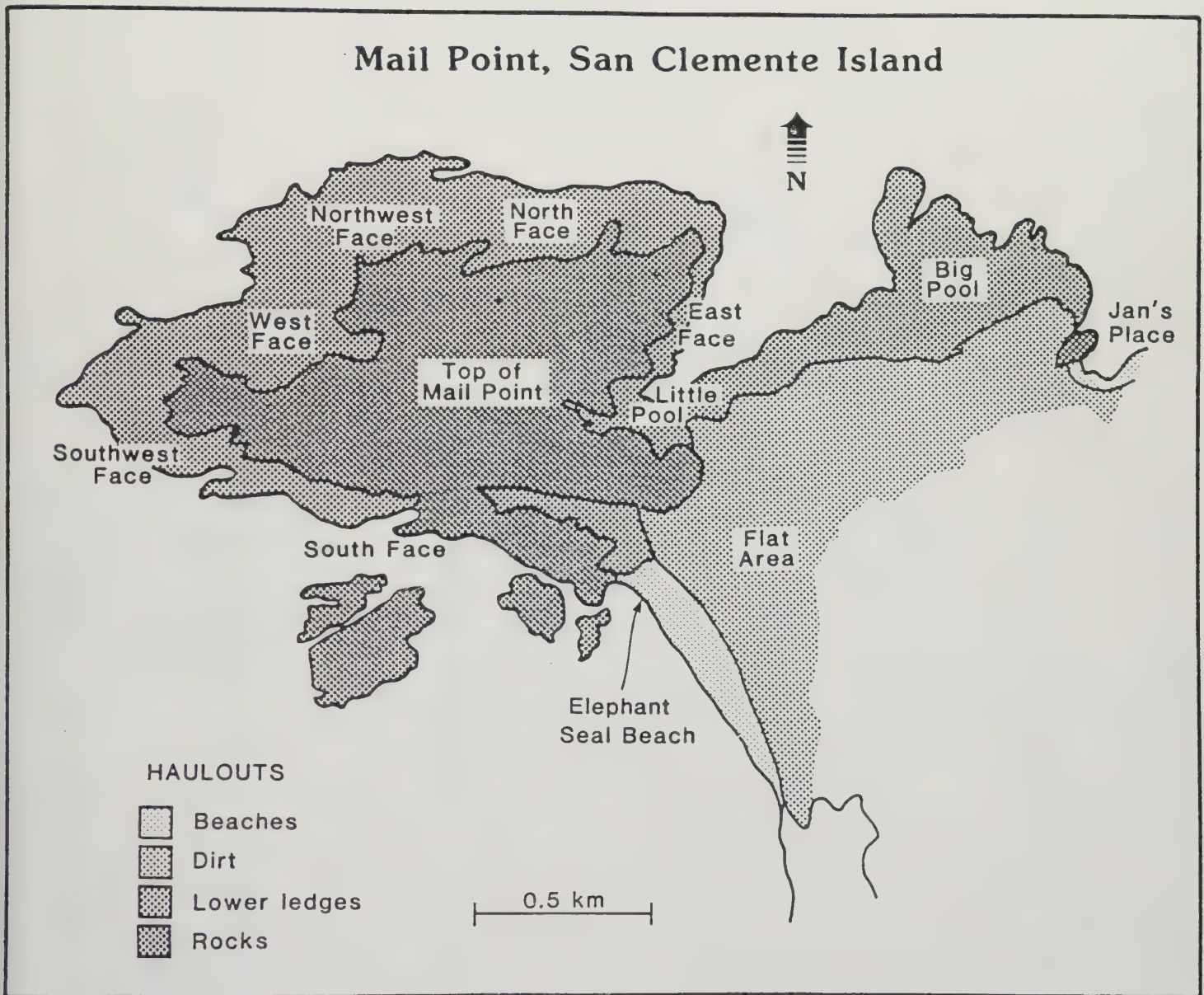


Figure 3. Haulout and breeding areas for California sea lions (*Zalophus californianus*) and northern elephant seals (*Mirounga angustirostris*) at Mail Point.

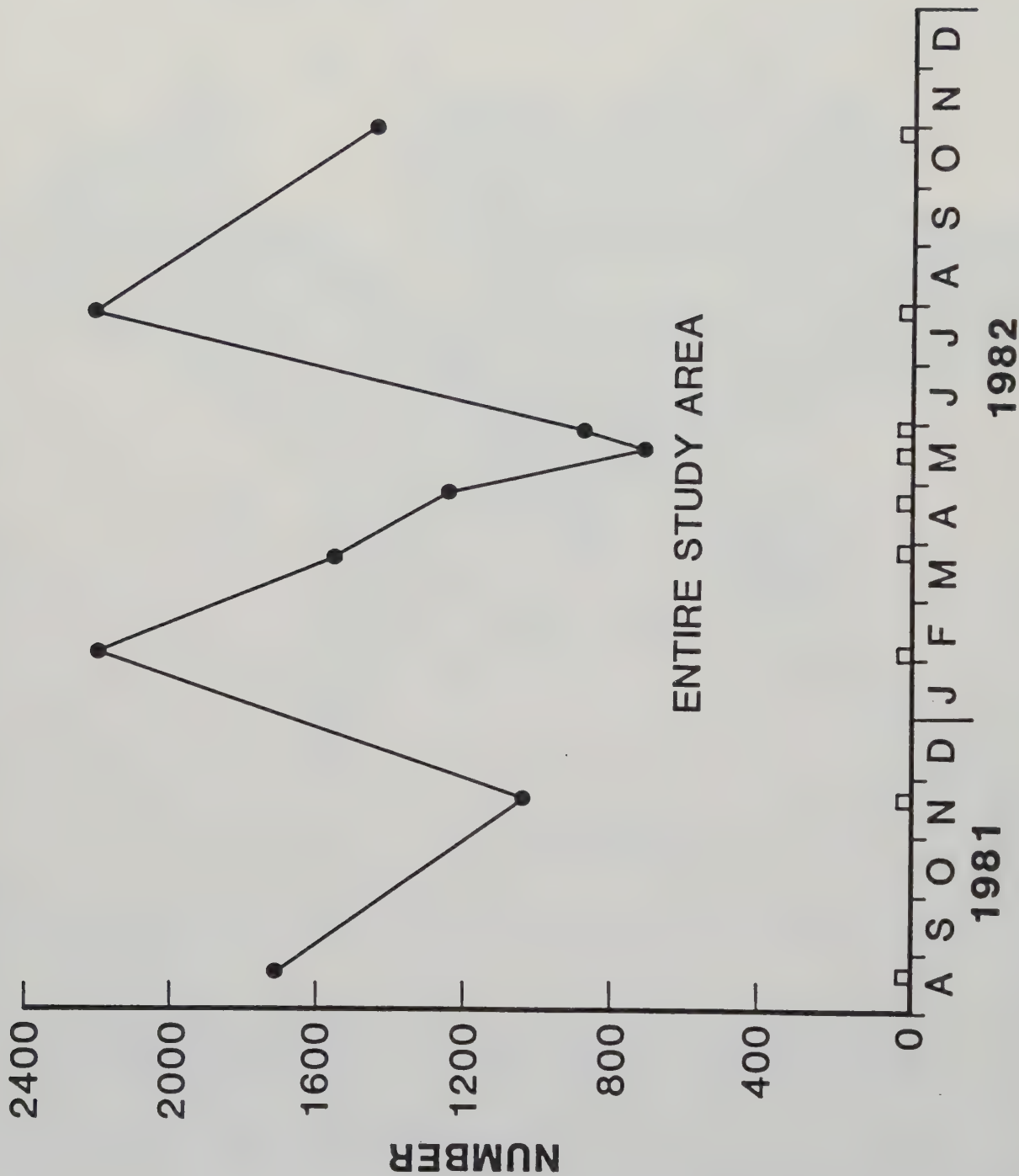


Figure 4. Total numbers of California sea lions observed in the entire study area at San Clemente Island for trips during which a complete count was obtained.

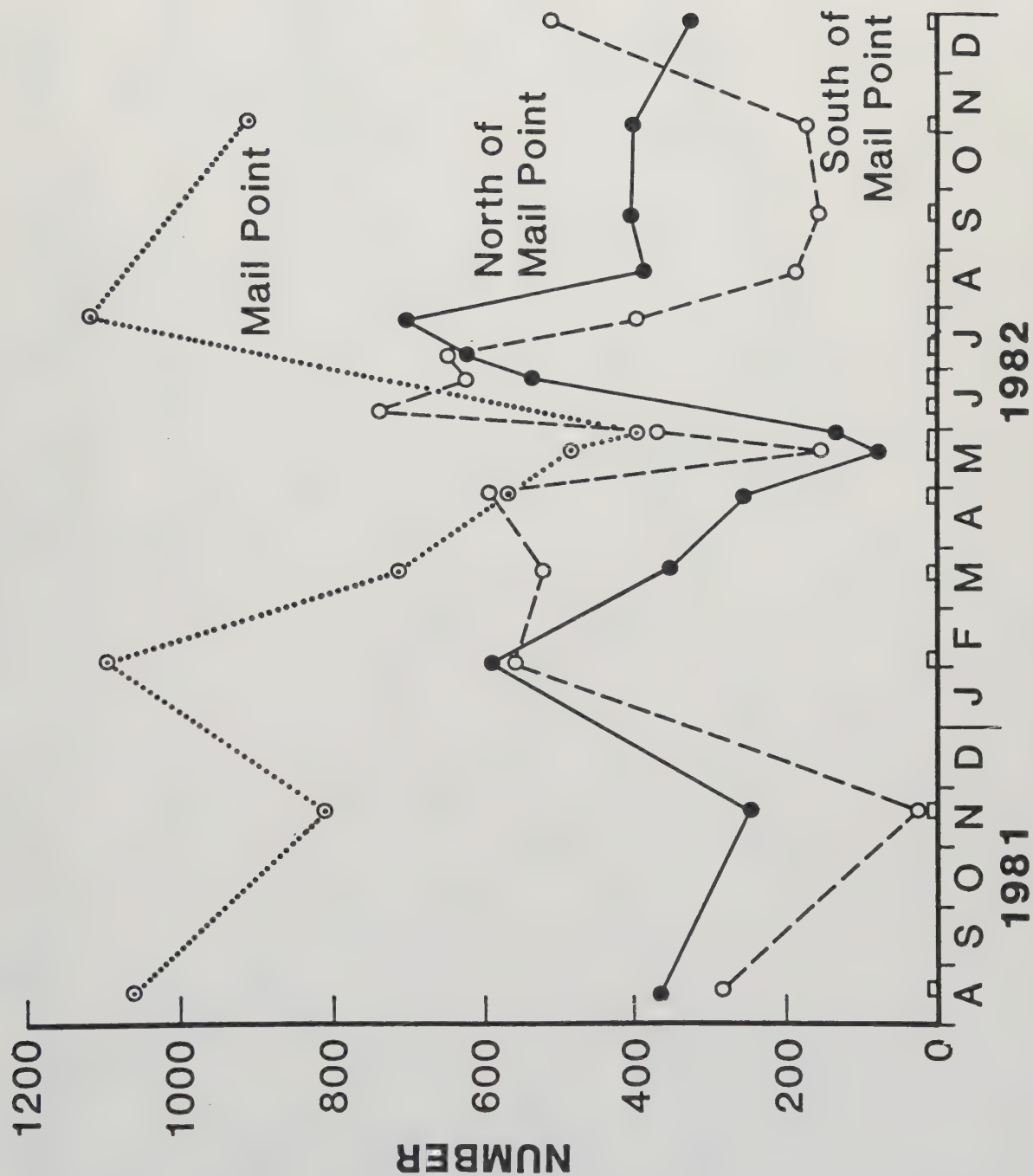


Figure 5. Total numbers of California sea lions observed in each of the sub-areas at San Clemente Island for trips during which a complete sub-area count was obtained.

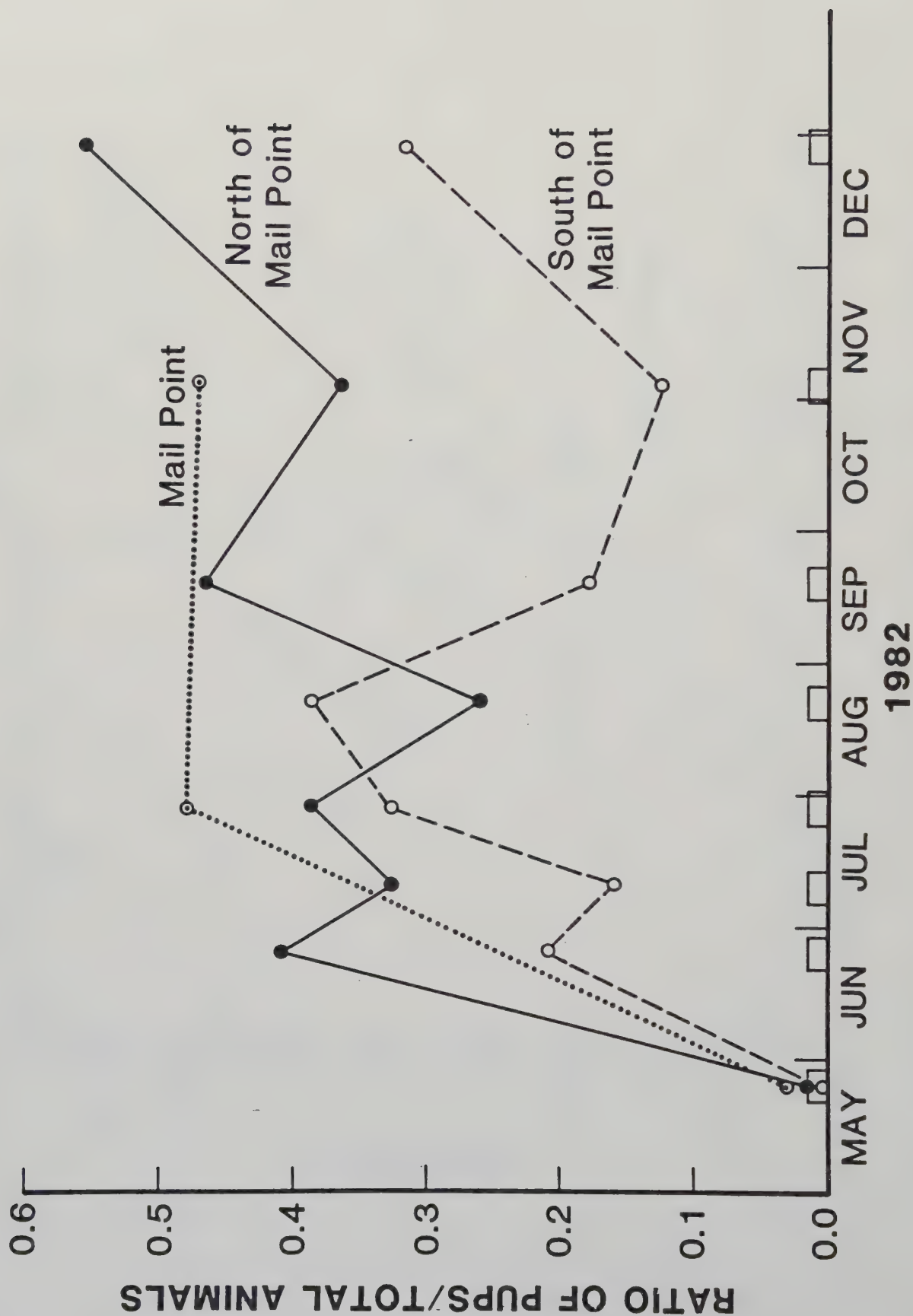


Figure 6. Ratios of 1982-cohort California sea lion pups to the total number of sea lions in the study area at San Clemente Island for the months of May through December 1982.

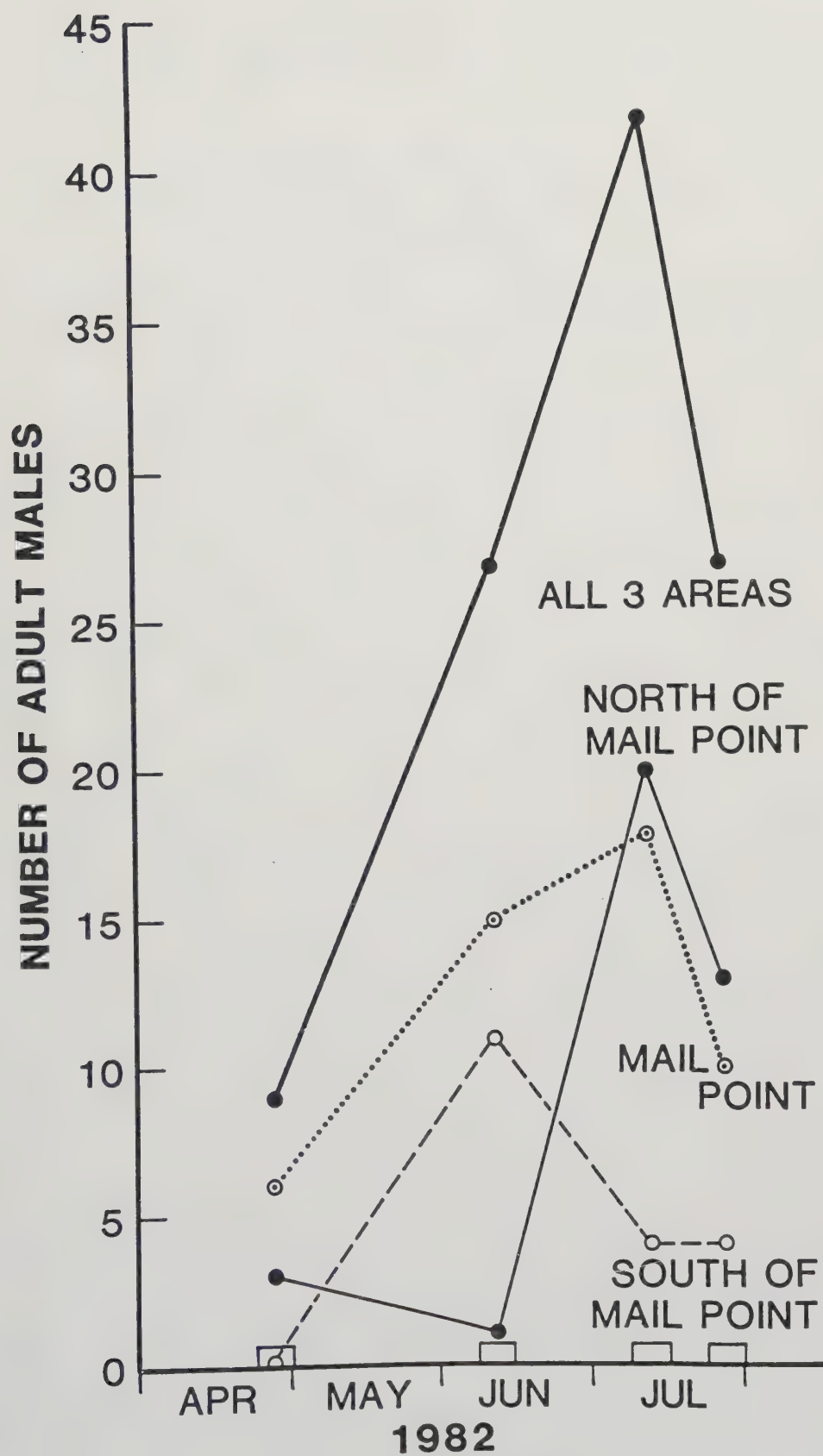


Figure 7. Total numbers of adult male California sea lions observed defending territory at San Clemente Island during the 1982 breeding season.

APPENDIX I.
PINNIPED LIFE HISTORY FORM

SPECIMEN NO <u>1</u> <u>7</u>	CARD NO <u>1</u> <u>9</u>	DATE <u>10</u> <u>15</u> YR MO DAY
SPECIES <u>16</u>	SEX <u>19</u>	STANDARD LENGTH <u>20</u> <u>23</u> <u>24</u>
LOCALITY <u>26</u>		CARCASS CONDITION <u>29</u>
POSITION <u>30</u> <u>36</u> <u>37</u> <u>44</u>	CARCASS DISPOSITION <u>46</u>	
STOMACH: EXAM <u>47</u> CONT COLL <u>48</u> TEETH COLL <u>49</u> HEAD COLL <u>50</u> BACULUM COLL <u>51</u>		
MANDIBLES COLLECTED: LEFT <u>52</u> RIGHT <u>53</u>		BLUBBER THICKNESS <u>54</u>
GUNSHOT <u>57</u>	PREDATOR WOUNDS <u>58</u>	FISH GEAR <u>59</u> FISH GEAR SCARS <u>60</u>
GONADS COLL <u>61</u>	PHOTOS <u>62</u>	END OF COLLECTION DATA? <u>63</u>
Skull retained <u>65</u>	Skeleton retained <u>66</u>	Gonad wt: L <u>67</u> <u>70</u> R <u>71</u> <u>74</u>
Sexual maturity <u>75</u>	Fetus: sex <u>76</u> wt <u>77</u> <u>80</u>	Spec. no. <u>1</u> <u>7</u> <u>9</u> <u>12</u>
Fetus: length <u>10</u> <u>13</u> coll <u>14</u>	Lactating <u>15</u>	Parasites: exam <u>16</u> coll <u>17</u>
Tissues collected: kidney <u>19</u> liver <u>20</u> blood/fluids <u>21</u> brain <u>22</u> blubber <u>23</u>		
other (specify) <u>24</u>		
Curvilinear length <u>25</u> <u>28</u>	Axillary girth <u>30</u> <u>33</u>	
Anterior length: foreflip <u>34</u> <u>37</u>	hindflip <u>38</u> <u>41</u>	Weight <u>42</u> <u>46</u>
Tags <u>47</u>	Tags coll <u>48</u>	Necropsied <u>50</u> Date of necropsy <u>51</u> <u>56</u>
Cause of Death: Primary <u>58</u> Secondary <u>60</u> Tertiary <u>62</u>		
Dentinal tooth counts <u>64</u>	Cementum tooth counts <u>66</u>	

NOTES:

Collected by: _____

APPENDIX I. PINNIPED LIFE HISTORY FORM (Continued)

CODES AND EXPLANATIONS FOR PINNIPED LIFE HISTORY FORM
ALL LINEAR MEASUREMENTS ARE MADE IN CENTIMETERS

Sex: 1=Male, 2=Female, 3=Unidentified

Standard length: Straight line distance from tip of nose to tip of tail while specimen is on back. To nearest 0.1 cm.

±: Error of standard length measurement

Carcass condition: 1=Alive, 2=Freshly dead, 3=Moderately decomposed, 4=Advanced decomposition, 5=Old carcass (mummified or skeletal remains)

Carcass disposition: 1=Dumped at landfill, 2=Buried at site, 3=Left at site, 4=Collected, 5=Other

Stomach examined: 1=Yes, 2=No

Stomach contents coll.: 1=Yes, 2=No, 3=No contents

Teeth coll.: 1=Yes, 2=No, 3=None available

Head coll.: 1=Yes, 2=No

Baculum coll.: 1=Yes, 2=No

Mandibles coll. (Right and Left): 1=Yes, 2=No, 3=Not available

Blubber thickness: Thickness of skin and blubber at posterior end of sternum. To the nearest tenth of centimeter.

Gunshot: 1=Yes, 2=No, 3=Unknown, 4=Possibly

Predator wounds: 1=Yes, 2=No, 3=Unknown, 4=Possibly

Fishing gear: 1=Yes, 2=No

Fishing gear scars: 1=Yes, 2=No, 3=Unknown, 4=Possibly

Gonads coll.: 1=Yes, 2=No

Photos: 1=Yes, 2=No

End of data: 1=Yes, 2=No

Skull retained: 1=Yes, 2=No

Skeleton retained: 1=Yes, 2=No

Gonad wt. (Left and Right): Weight to nearest tenth of gram

Fetus sex: 1=Male, 2=Female, 3=Unable to determine

Fetus wt.: Weight to nearest tenth of gram

Fetus length: Length to nearest tenth of centimeter

Fetus coll.: 1=Yes, 2=No

Lactating: 1=Yes, 2=No, 3=Unable to determine

Parasites examined: 1=Yes, 2=No, 3=Unable to determine

Parasites coll.: 1=Yes, 2=No

Tissues coll.: 1=Yes, 2=No

Curvilinear length: The length of the specimen from the tip of the nose to tip of the tail measured dorsally with a tape to nearest tenth of centimeter.

Axillary girth: The circumference of the carcass at the axilla measured to the nearest .5 centimeter.

Anterior length of

foreflipper and hindflipper: The length of the anterior edge of the flipper in a straight line from the insertion to the tip of first claw to nearest tenth of centimeter.

Weight: To the nearest tenth kilogram

Tags: 1=Yes, 2=No

Tags coll.: 1=Yes, 2=No

Necropsied: 1=Yes, 2=No

Appendix II. Dead strandings of marine mammals salvaged on San Clemente Island during 1981-1982.

DATE	SPECIMEN NUMBER	SPECIES ¹	LATITUDE	LONGITUDE	SEX ²	AGE CLASS ³	SPECIMEN PARTS COLLECTED	
							TEETH ?	SKULL ?
811015	JRH0220	Z	32 53'00''N	118 30'55''W	M	U	YES	YES
811015	JRH0221	Z	32 53'00''N	118 30'55''W	U	U	YES	
811015	JRH0222	Z	32 53'00''N	118 30'55''W	U	U	YES	
811115	MSL0189	Z	32 53'04''N	118 31'02''W	F	SA	YES	
811115	MSL0190	Z	32 53'03''N	118 31'02''W	U	Y	YES	
811115	MSL0191	Z	32 53'03''N	118 31'01''W	U	SA	YES	
811115	MSL0192	Z	32 53'03''N	118 31'00''W	F	A	YES	
811115	MSL0193	Z	32 53'03''N	118 31'00''W	M	P81	YES	
820119	CW00816	Z	32 53'07''N	118 31'08''W	U	J		
820128	CW00817	Z	32 51'53''N	118 30'16''W	U	SA		
820203	CW00818	Z	32 53'07''N	118 31'08''W	U	SA	YES	
820203	CW00819	Z	32 53'20''N	118 31'10''W	U	SA		
820324	CW00820	Z	32 53'07''N	118 31'04''W	U	SA		
820324	CW00821	Z	32 53'07''N	118 31'04''W	U	SA		
820324	CW00822	Z	32 53'07''N	118 31'04''W	U	J		
820324	CW00823	Z	32 53'07''N	118 31'04''W	U	J		
820324	CW00824	Z	32 53'07''N	118 31'04''W	U	P81		
820324	CW00825	Z	32 53'07''N	118 31'04''W	U	P81		
820324	CW00826	Z	32 53'07''N	118 31'04''W	U	P81		
820324	CW00827	Z	32 53'07''N	118 31'04''W	U	P81		
820324	CW00828	Z	32 53'07''N	118 31'04''W	U	P81		
820324	CW00829	Z	32 53'07''N	118 31'04''W	U	P81		
820324	CW00830	Z	32 53'07''N	118 31'04''W	U	P81		
820324	CW00831	Z	32 53'07''N	118 31'04''W	U	P81		
820324	CW00832	Z	32 53'07''N	118 31'04''W	U	P81		
820324	CW00833	Z	32 53'07''N	118 31'04''W	U	P81		
820324	CW00834	Z	32 53'07''N	118 31'04''W	U	P81		
820324	CW00835	Z	32 53'07''N	118 31'04''W	U	P81		
820324	CW00836	Z	32 53'07''N	118 31'04''W	U	P81		
820324	CW00837	Z	32 53'07''N	118 31'04''W	U	P81		
820324	CW00838	Z	32 53'07''N	118 31'04''W	U	P81		
820324	CW00839	Z	32 53'07''N	118 31'04''W	U	P81		
820324	CW00840	Z	32 53'07''N	118 31'04''W	U	P81		
820427	CW00841	Z	32 53'07''N	118 31'08''W	U	PRE	YES	YES

¹ SPECIES: D=Common dolphin (Delphinus delphis)
P=Harbor seal (Phoca vitulina richardsi)
U=Unidentified pinniped species
Z=California sea lion (Zalophus californianus)

² SEX: M=Male; F=Female; U=Unknown

³ AGE CLASS: P81=Pup of 1981; P82=Pup of 1982; Y=Yearling; J=Juvenile;
SA=Subadult; A=Adult; U=Unknown; PRE=Premature

Appendix II. continued

DATE	SPECIMEN NUMBER	SPECIES ¹	LATITUDE	LONGITUDE	SEX ²	AGE CLASS ³	SPECIMEN PARTS COLLECTED	
							TEETH ?	SKULL ?
820427	CW00842	Z	32 53'07''N	118 31'08''W	U	PRE		
820427	CW00843	Z	32 53'08''N	118 31'08''W	U	PRE	YES	YES
820427	CW00844	Z	32 53'07''N	118 31'08''W	U	PRE	YES	YES
820427	CW00845	Z	32 53'07''N	118 31'04''W	U	PRE	YES	YES
820427	CW00846	Z	32 53'07''N	118 31'04''W	U	PRE	YES	YES
820427	CW00847	Z	32 53'50''N	118 31'33''W	U	U	YES	
820428	MSL0211	Z	32 51'20''N	118 29'55''W	F	A		
820428	MSL0212	Z	32 53'10''N	118 31'02''W	M	A	YES	
820428	MSL0215	Z	32 51'10''N	118 29'57''W	U	U		
820428	MSL0216	Z	32 51'21''N	118 29'55''W	F	U		
820428	MSL0217	U	32 51'58''N	118 30'18''W	U	U		
820428	MSL0218	Z	32 52'00''N	118 30'22''W	U	U		
820513	DPD0004	Z	32 52'51''N	118 30'36''W	F	PRE		
820513	DPD0005	Z	32 52'51''N	118 30'36''W	U	PRE		
820513	DPD0006	Z	32 52'51''N	118 30'36''W	F	PRE		
820513	DPD0007	Z	32 52'51''N	118 30'36''W	F	PRE		
820513	DPD0008	Z	32 52'51''N	118 30'36''W	M	PRE		
820513	DPD0009	Z	32 52'51''N	118 30'36''W	U	PRE		
820513	DPD0010	Z	32 52'31''N	118 30'36''W	F	PRE		
820526	MSL0219	Z	32 53'10''N	118 31'10''W	F	P82	YES	
820526	MSL0220	Z	32 53'10''N	118 31'10''W	M	P82	YES	
820528	MSL0222	Z	32 53'15''N	118 31'05''W	U	A		
820528	MSL0223	Z	32 53'15''N	118 31'05''W	U	A		
820528	MSL0224	U	32 53'15''N	118 31'05''W	U	U		
820528	MSL0226	Z	32 53'20''N	118 31'08''W	U	SA	YES	
820528	MSL0227	Z	32 53'20''N	118 31'08''W	U	A	YES	
820615	CW00848	Z	32 48'20''N	118 25'40''W	F	A		
820615	CW00849	Z	32 48'45''N	118 25'40''W	U	P81		
820615	CW00850	P	32 48'15''N	118 25'40''W	U	U		
820630	MSL0249	Z	32 53'10''N	118 31'10''W	F	P82	YES	
820630	MSL0250	Z	32 53'17''N	118 31'05''W	U	A		
820630	MSL0251	Z	32 53'20''N	118 31'06''W	U	A		
820630	MSL0252	Z	32 53'49''N	118 31'30''W	U	A	YES	
820714	CW00851	Z	32 52'50''N	118 30'40''W	F	U		
820727	CW00852	Z	32 53'15''N	118 31'05''W	F	U		
820727	MSL0258	Z	32 53'09''N	118 31'07''W	U	P82		
820727	MSL0259	Z	32 53'11''N	118 31'08''W	U	SA	YES	
820727	MSL0260	Z	32 53'12''N	118 31'06''W	U	Y		
820727	CW00853	D	32 53'12''N	118 31'04''W	U	U		
820728	CW00854	Z	32 52'57''N	118 30'48''W	M	A	YES	YES
820729	CW00855	Z	32 52'17''N	118 30'25''W	F	A	YES	
820729	CW00856	Z	32 52'17''N	118 30'25''W	U	U		
820729	CW00857	U	32 52'17''N	118 30'25''W	U	U		
820729	MSL0261	Z	32 52'23''N	118 30'23''W	U	P82		
820729	MSL0262	Z	32 52'16''N	118 30'27''W	U	A		

Appendix II. continued

DATE	SPECIMEN NUMBER	SPECIES ¹	LATITUDE	LONGITUDE	SEX ²	AGE CLASS ³	SPECIMEN PARTS COLLECTED	
							TEETH ?	SKULL ?
820729	MSL0263	Z	32 52'16''N	118 30'25''W	U	A		
820729	MSL0264	Z	32 52'15''N	118 30'26''W	U	Y		
820729	MSL0265	Z	32 52'17''N	118 30'26''W	U	P82		
820729	MSL0266	Z	32 52'16''N	118 30'26''W	U	P82		
820916	CW00858	Z	32 52'57''N	118 30'50''W	U	J		
820916	CW00859	Z	32 52'54''N	118 30'50''W	U	J		
820916	CW00860	Z	32 52'54''N	118 30'50''W	U	A		
821103	CW00861	Z	32 52'51''N	118 30'36''W	F	A	YES	
821103	CW00862	Z	32 52'51''N	118 30'36''W	F	A	YES	
821103	CW00863	Z	32 52'51''N	118 30'36''W	F	A	YES	YES
821103	CW00864	Z	32 53'07''N	118 31'08''W	U	J		
821103	CW00869	Z	32 52'51''N	118 30'36''W	U	P82		
821104	CW00865	Z	32 51'18''N	118 29'54''W	U	A		
821104	CW00866	Z	32 51'26''N	118 29'56''W	U	SA		
821104	CW00867	Z	32 51'53''N	118 30'16''W	M	A	YES	YES
821104	CW00868	Z	32 51'53''N	118 30'16''W	U	P82	YES	
821104	MSL0271	Z	32 51'25''N	118 29'56''W	U	P82		
821104	MSL0272	Z	32 51'30''N	118 29'58''W	F	A	YES	
821104	MSL0273	Z	32 51'53''N	118 30'16''W	F	A	YES	YES
821104	MSL0274	Z	32 52'13''N	118 30'25''W	U	P82	YES	
821104	MSL0275	Z	32 52'51''N	118 30'36''W	F	A	YES	YES

Appendix III. White tags placed on California sea lions, Zalophus californianus, at San Clemente Island during 1981. All tags were Dalton Jumbo Roto.

ANIMAL ID	DATE (YR/MO/DAY)	LOCAL TIME	LEFT FLIPPER TAG NUMBER	RIGHT FLIPPER TAG NUMBER	SEX	AGE CLASS		ANIMAL CONDITION G=GOOD F=FAIR P=POOR	ANIMAL WEIGHT (KG)
						P=PUP			
						Y=YEARLING			
						J=JUVENILE			
						S=SUBADULT	A=ADULT		
1	81/09/10	900	1	1	M	P		G	
2	81/09/10	1315	2	2	M	P		G	
3	81/09/10	1315	3	3	F	P		G	
4	81/09/10	1315	4	4	M	P		G	
5	81/09/10	1315	5	5	F	P		G	
6	81/09/10	1315	6	6	F	P		G	
7	81/09/10	1315	7	7	F	P		G	
8	81/09/10	1315	8	8	F	P		G	
9	81/09/10	1315	9	9	M	P		G	
10	81/09/10	1315	10	10	M	P		G	
11	81/09/10	1315	11	11	M	P		G	
12	81/09/10	1315	12	12	M	P		G	
13	81/09/10	1315	13	13	M	P		G	
14	81/09/10	1315	14	14	F	P		G	
15	81/09/10	1315	15	15	F	P		G	
16	81/09/10	1315	16	16	F	P		G	
17	81/09/10	1315	17	17	F	P		G	
18	81/09/10	1315	18	18	M	P		G	
19	81/09/10	1315	19	19	M	P		G	
20	81/09/10	1315	20	20	F	P		G	
21	81/09/10	1315	21	21	F	P		G	
22	81/09/10	1315	22	22	M	P		G	
23	81/09/10	1315	23	23	M	P		G	
24	81/09/10	1315	24	24	M	P		G	
25	81/09/10	1030	25	25	F	P		G	
26	81/09/10	1030	26	26	F	P		G	
27	81/09/10	1030	27	27	M	P		G	
28	81/09/10	1050	28	28	F	P		G	
29	81/09/10	1050	29	29	M	P		G	
30	81/09/10	1050	30	30	M	P		G	
31	81/09/10	1050	31	31	F	P		G	
32	81/09/10	1050	32	32	M	P		G	
33	81/09/10	1315	33	33	F	P		G	
34	81/09/10	1315	34	34	M	P		G	
35	81/09/10	1315	35	35	M	P		G	
36	81/09/10	1315	36	36	M	P		G	
37	81/09/10	1315	37	37	F	P		G	
38	81/09/10	1315	38	38	F	P		G	
39	81/09/10	1315	39	39	F	P		G	
40	81/09/10	1315	40	40	M	P		G	
41	81/09/10	1315	41	41	F	P		G	
42	81/09/10	1315	42	42	F	P		G	

Appendix III. continued

ANIMAL ID	DATE (YR/MO/DAY)	LOCAL TIME	LEFT FLIPPER TAG NUMBER	RIGHT FLIPPER TAG NUMBER	SEX	AGE CLASS		ANIMAL CONDITION	ANIMAL WEIGHT (KG)
						P=PUP	Y=YEARLING		
						J=JUVENILE	S=SUBADULT	G=GOOD	
						A=ADULT		F=FAIR	
								P=POOR	
43	81/09/10	1315	43	43	M	P		G	
44	81/09/10	1315	44	44	M	P		G	
45	81/09/10	1315	45	45	M	P		G	
46	81/09/10	1315	46	46	F	P		G	
47	81/09/10	1315	47	47	F	P		G	
48	81/09/10	1315	48	48	F	P		G	
49	81/09/10	1315	49	49	F	P			
50	81/09/10	1315	50	50	M	P			
51	81/09/10	1315	51	51	F	P			
52	81/09/10	1315	52	52	M	P			
53	81/09/10	1315	53	53	M	P			
54	81/09/10	1315	54	54	M	P			
55	81/09/10	1315	55	55	F	P			
56	81/09/10	1315	56	56	F	P			
57	81/09/10	1315	57	57	M	P			
58	81/09/10	1315	58	58	M	P			
59	81/09/10	1315	59	59	M	P			
60	81/09/10	1315	60	60	M	P			
61	81/09/10	1315	61	61	M	P			
62	81/09/10	1315	62	62	M	P			
63	81/09/10	1315	63	63	M	P			
64	81/09/10	1315	64	64	F	P			
65	81/09/10	1315	65	65	M	P			
66	81/09/10	1315	66	66	F	P			
67	81/09/10	1315	67	67	F	P			
68	81/09/10	1315	68	68	F	P			
69	81/09/11	850	69	69	M	P			
70	81/09/11	850	70	70	M	P			
71	81/09/11	850	71	71	M	P			

Appendix IV. White tags placed on northern elephant seals, Mirounga augustirostris, at San Clemente Island during 1982. All tags were Dalton Jumbo Roto.

ANIMAL ID	DATE (YR/MO/DAY)	LOCAL TIME	LEFT FLIPPER TAG NUMBER	RIGHT FLIPPER TAG NUMBER	SEX	AGE CLASS	ANIMAL CONDITION
						P=PUP Y=YEARLING J=JUVENILE S=SUBADULT A=ADULT	
72	82/01/27	1500		72	F	A	G
73	82/01/28	1600	73			Y	G
74	82/02/03	1435	74	74	M	P	G
75	82/02/03	2200		75	M	A	G
76	82/02/04	1000	76	76		P	F
77	82/02/09	1600		77		Y	G
78	82/03/23	1810	78	78	F	P	G
79	82/03/24	700	79	79		P	G

Appendix III. continued

ANIMAL ID	DATE (YR/MO/DAY)	LOCAL TIME	LEFT FLIPPER TAG NUMBER	RIGHT FLIPPER TAG NUMBER	SEX	AGE CLASS		ANIMAL CONDITION	ANIMAL WEIGHT (KG)
						P=PUP	Y=YEARLING		
						J=JUVENILE	S=SUBADULT	G=GOOD	
						A=ADULT		F=FAIR	
								P=POOR	
43	81/09/10	1315	43	43	M	P		G	
44	81/09/10	1315	44	44	M	P		G	
45	81/09/10	1315	45	45	M	P		G	
46	81/09/10	1315	46	46	F	P		G	
47	81/09/10	1315	47	47	F	P		G	
48	81/09/10	1315	48	48	F	P		G	
49	81/09/10	1315	49	49	F	P			
50	81/09/10	1315	50	50	M	P			
51	81/09/10	1315	51	51	F	P			
52	81/09/10	1315	52	52	M	P			
53	81/09/10	1315	53	53	M	P			
54	81/09/10	1315	54	54	M	P			
55	81/09/10	1315	55	55	F	P			
56	81/09/10	1315	56	56	F	P			
57	81/09/10	1315	57	57	M	P			
58	81/09/10	1315	58	58	M	P			
59	81/09/10	1315	59	59	M	P			
60	81/09/10	1315	60	60	M	P			
61	81/09/10	1315	61	61	M	P			
62	81/09/10	1315	62	62	M	P			
63	81/09/10	1315	63	63	M	P			
64	81/09/10	1315	64	64	F	P			
65	81/09/10	1315	65	65	M	P			
66	81/09/10	1315	66	66	F	P			
67	81/09/10	1315	67	67	F	P			
68	81/09/10	1315	68	68	F	P			
69	81/09/11	850	69	69	M	P			
70	81/09/11	850	70	70	M	P			
71	81/09/11	850	71	71	M	P			

Appendix IV. White tags placed on northern elephant seals, Mirounga augustirostris, at San Clemente Island during 1982. All tags were Dalton Jumbo Roto.

ANIMAL ID	DATE (YR/MO/DAY)	LOCAL TIME	LEFT FLIPPER TAG NUMBER	RIGHT FLIPPER TAG NUMBER	SEX	AGE CLASS	
						P=PUP	ANIMAL
						Y=YEARLING	CONDITION
						J=JUVENILE	G=GOOD
						S=SUBADULT	F=FAIR
						A=ADULT	P=POOR
72	82/01/27	1500		72	F	A	G
73	82/01/28	1600	73			Y	G
74	82/02/03	1435	74	74	M	P	G
75	82/02/03	2200		75	M	A	G
76	82/02/04	1000	76	76		P	F
77	82/02/09	1600		77		Y	G
78	82/03/23	1810	78	78	F	P	G
79	82/03/24	700	79	79		P	G

Appendix V. While tags placed on California sea lions, Zalophus californianus, at San Clemente Island during 1982. All tags were Dalton Jumbo Roto.

ANIMAL ID	DATE (YR/MO/DAY)	LOCAL TIME	AGE CLASS		SEX	P=PUP Y=YEARLING J=JUVENILE S=SUBADULT A=ADULT	ANIMAL CONDITION G=GOOD F=FAIR P=POOR	ANIMAL WEIGHT (KG)
			LEFT	RIGHT				
			FLIPPER	FLIPPER				
			TAG	TAG				
			NUMBER	NUMBER				
81	82/09/18	1045	81	81	F	P	G	20.8
82	82/09/18	1045	82	82	F	P	F	12.7
83	82/09/18	1045	83	83	F	P	G	18.1
84	82/09/18	1045	84	84	F	P	G	19.9
85	82/09/18	1100	85	85	M	P	F	9.1
86	82/09/18	1100	86	86	M	P	F	13.6
87	82/09/18	1100	87	87	M	P	G	24.0
88	82/09/18	1100	88	88	F	P	G	16.8
89	82/09/18	1100	89	89	F	P	F	13.1
90	82/09/18	1100	90	90	M	P	G	19.5
91	82/09/18	1100	91	91	M	P	G	23.6
92	82/09/18	1120	92	92	F	P	G	16.8
93	82/09/18	1120	93	93	F	P	G	18.1
94	82/09/18	1120	94	94	M	P	G	24.5
95	82/09/18	1120	95	95	F	P	G	20.4
96	82/09/18	1215	96	96	F	P	G	16.8
97	82/09/18	1215	97	97	F	P	G	19.0
98	82/09/18	1215	98	98	F	P	G	21.7
99	82/09/18	1215	99	99	M	P	G	23.1
100	82/09/18	1230	100	100	F	P	G	17.2
101	82/09/18	1230	101	101	F	P	G	19.5
102	82/09/18	1230	102	102	M	P	G	20.8
103	82/09/18	1230	103	103	F	P	G	20.4
104	82/09/18	1230	104	104	M	P	G	20.8
105	82/09/18	1255	105	105	F	P	G	
106	82/09/18	1255	106	106	F	P	G	
107	82/09/18	1255	107	107	F	P	F	11.8
108	82/09/18	1255	108	108	M	P	G	21.7
109	82/09/18	1255	109	109	F	P	G	21.3
110	82/09/18	1320	110	110	M	P	G	
111	82/09/18	1320	111	111	M	P	G	22.2
112	82/09/18	1320	112	112	F	P	G	20.8
113	82/09/18	1320	113	113	M	P	G	20.8
114	82/09/18	1320	114	114	F	P	G	21.3
115	82/09/18	1335	115	115	M	P	G	19.9
116	82/09/18	1500	116	116	F	P	G	24.0
117	82/09/18	1500	117	117	F	P	G	22.2
118	82/09/18	1500	118	118	F	P	G	18.6
119	82/09/18	1500	119	119	M	P	G	24.9
120	82/09/18	1500	120	120	F	P	G	20.8
121	82/09/18	1500	121	121	F	P	G	17.2

Appendix V. continued

ANIMAL ID	DATE (YR/MO/DAY)	LOCAL TIME	LEFT FLIPPER TAG NUMBER	RIGHT FLIPPER TAG NUMBER	SEX	AGE CLASS	ANIMAL CONDITION	ANIMAL WEIGHT (KG)
						P=PUP Y=YEARLING J=JUVENILE S=SUBADULT A=ADULT		
122	82/09/18	1500	122	122	M	P	G	24.9
123	82/09/18	1500	123	123	M	P	G	19.5
124	82/09/18	1500	124	124	F	P	G	20.4
125	82/09/18	1530	125	125	F	P	G	16.8
126	82/09/18	1530	126	126	F	P	G	19.5
127	82/09/18	1530	127	127	M	P	G	22.2
128	82/09/18	1530	128	128	M	P	G	19.9
129	82/09/18	1530	129	129	M	P	G	22.6
130	82/09/18	1530	130	130	F	P	G	17.2
131	82/09/18	1600	131	131	F	P	G	20.8
132	82/09/18	1600	132	132	M	P	G	17.2
133	82/09/18	1600	133	133	F	P	G	23.1
134	82/09/18	1605	134	134	M	P	G	22.2
135	82/09/18	1605	135	135	M	P	G	19.9
136	82/09/18	1605	136	136	M	P	G	24.9
137	82/09/18	1610	137	137	M	P	G	21.7
138	82/09/18	1610	138	138	F	P	G	16.8
139	82/09/18	1610	139	139	M	P	G	23.1
140	82/09/18	1615	140	140	M	P	G	24.9
141	82/09/18	1615	141	141	F	P	G	18.1
142	82/09/18	1615	142	142	F	P	F	11.8
143	82/09/18	1625	143	143	M	P	G	24.5
144	82/09/18	1625	144	144	F	P	G	17.7
145	82/09/18	1625	145	145	F	P	G	21.3
146	82/09/18	1625	146	146	M	P	G	20.8
147	82/09/18	1625	147	147	F	P	G	21.7
148	82/09/18	1630	148	148	F	P	G	14.0
149	82/09/18	1630	149	149	F	P	G	20.8
150	82/09/18	1630	150	150	F	P	G	18.6
151	82/09/18	1630	151	151	M	P	G	25.8
152	82/09/18	1630	152	152	M	P	G	20.4
153	82/09/18	1630	153	153	M	P	G	22.2
154	82/09/18	1630	154	154	F	P	G	18.6
155	82/09/18	1645	155	155	F	P	G	18.1
156	82/09/18	1645	156	156	F	P	F	13.6
157	82/09/18	1645	157	157	F	P	G	21.3
158	82/09/18	1645	158	158	F	P	G	19.5
159	82/09/18	1645	159	159	M	P	G	21.3
160	82/09/18	1645	160	160	M	P	G	22.2
161	82/09/18	1645	161	161	F	P	G	19.9
162	82/09/18	1645	162	162	F	P	G	22.6
163	82/09/18	1645	163	163	M	P	G	24.9

Appendix V. continued

ANIMAL ID	DATE (YR/MO/DAY)	LOCAL TIME	LEFT FLIPPER TAG NUMBER	RIGHT FLIPPER TAG NUMBER	SEX	AGE CLASS		ANIMAL CONDITION G=GOOD F=FAIR P=POOR	ANIMAL WEIGHT (KG)
						P=PUP			
						Y=YEARLING			
						J=JUVENILE			
						S=SUBADULT			
						A=ADULT			
164	82/09/18	1645	164	164	F	P		G	18.1
165	82/09/18	1645	165	165	F	P		G	18.6
166	82/09/18	1700	166	166	F	P		G	22.2
167	82/09/18	1700	167	167	M	P		G	22.2
168	82/09/18	1700	168	168	F	P		G	18.1
169	82/09/18	1700	169	169	F	P		G	18.6
170	82/09/18	1700	170	170	M	P		G	28.1
172	82/09/18	1700	172	172	M	P		G	18.6
173	82/09/18	1700	173	173	M	P		G	28.5
174	82/09/18	1700	174	174	M	P		G	19.5
175	82/09/18	1700	175	175	M	P		G	19.5
176	82/09/18	1700	176	176	M	P		G	24.0
177	82/09/18	1715	177	177	M	P		G	25.4
178	82/09/18	1715	178	178	M	P		G	23.1
179	82/09/18	1715	179	179	F	P		G	21.7
180	82/09/18	1715	180	180	M	P		G	14.5
181	82/09/18	1715	181	181	M	P		G	24.5
182	82/09/18	1715	182	182	F	P		G	21.3
183	82/09/18	1715	183	183	M	P		G	24.5
184	82/09/18	1715	184	184	F	P		G	20.4
185	82/09/18	1715	185	185	F	P		G	15.4
186	82/09/18	1715	186	186	M	P		G	14.9
187	82/09/18	1730	187	187	M	P		G	16.3
188	82/09/18	1730	188	188	M	P		G	21.7
189	82/09/18	1730	189	189	F	P		G	14.9
190	82/09/18	1730	190	190	F	P		G	22.6
191	82/09/18	1730	191	191	M	P		G	25.4
192	82/09/18	1730	192	192	M	P		G	19.0
193	82/09/18	1730	193	193	F	P		G	16.8
194	82/09/18	1745	194	194	M	P		G	15.9
195	82/09/18	1745	195	195	M	P		G	18.6
196	82/09/18	1745	196	196	M	P		G	24.0
197	82/09/18	1745	197	197	F	P		G	13.1
198	82/09/18	1745	198	198	F	P		G	21.3
199	82/09/18	1745	199	199	F	P		G	17.7
200	82/09/18	1800	200	200	F	P		G	19.5
201	82/09/19	1600	201	201	M	P			
202	82/09/19	1600	202	202	F	P			
203	82/09/19	1600	203	203	M	P			
204	82/09/19	1630	204	204	F	P			
205	82/09/19	1630	205	205	F	P			
206	82/09/19	1630	206	206	M	P			

Appendix V. continued

ANIMAL ID	DATE (YR/MO/DAY)	LOCAL TIME	LEFT FLIPPER TAG NUMBER	RIGHT FLIPPER TAG NUMBER	SEX	AGE CLASS	ANIMAL CONDITION	ANIMAL WEIGHT (KG)
						P=PUP Y=YEARLING J=JUVENILE S=SUBADULT A=ADULT		
207	82/09/19	1630	207	207	F	P		
208	82/09/19	1645	208	208	M	P		
209	82/09/19	1645	209	209	F	P		
210	82/09/19	1645	210	210	M	P		
211	82/09/19	1645	211	211	F	P		
213	82/09/19	1700	213	213	M	P		
214	82/09/19	1700	214	214	F	P		
215	82/09/19	1700	215	215	M	P		
216	82/09/19	1715	216	216	F	P		

